University of Alberta

Secure Base Behaviour in Children with Autism

by

Lesley Joyce Deprey

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Doctor of Philosophy

in

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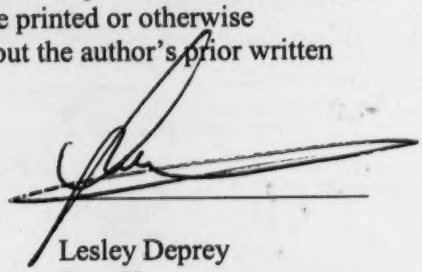

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Abstract

The present study explored secure base behaviour in children with autism. Given the social and communication deficits, odd and unusual behavioural presentations, etiological variability, and a wide presentation of symptom severity in children with autism, along with the limited research in the area of attachment behaviour in this clinical population, differences in the use of a secure base was examined. Previous studies reported that differences existed in attachment behaviour in relation to development level (Rogers et al., 1991). Although past research utilizing small sample sizes has explored attachment behaviour in children with autism, many issues seem to complicate the interpretation of the findings.

One hundred and eight children with ages ranging from 24 months to 59 months took part in this study. All participants were obtained from the Autism Genetic Resource Exchange (AGRE) research team database and had been formally diagnosed with Autistic Disorder. The primary research question predicted differences between children with autism who were less than 4 ($n = 51$) and those who were 4 years old ($n = 57$) in relation to secure base behavior. Three secondary research questions within each group examined variables, within and across, the domains of communication, socialization, and interest/behaviours in relation to a child's use of a secure base.

The Autism Diagnostic Interview – Revised (ADI-R) was utilized in measuring secure base behaviour. Results indicated no significant differences between the younger and older group. However, the variables which predicted attachment behaviour were different between groups. Overall, the specific variables of separation anxiety, sharing excitement in another's pleasure, greeting behaviour, and showing and directing attention were significantly related to demonstrations of secure base behaviour. Results and limitations of the study are discussed. Theoretical issues related to the classification of attachment and the need for a Type E classification category along with subsequent treatment implications are offered. Directions for further research in the area of attachment in autism are outlined.

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Chapter One

Introduction

Overview

Kanner (1943) utilized the term "infantile autism" to describe children, who in contrast to typically developing infants displayed a remarkable lack of interest in others. The fundamental aspect of infantile autism was the "inability to relate in the ordinary way to people and situations from the beginning of life" (Kanner, 1943, p. 242). Later on the term "autism" was first coined by Bleuler (1950) to describe persons diagnosed with schizophrenia who demonstrated a loss of contact with reality.

According to Volkmar (1997) autism is widely regarded as the most severe disorder of childhood and adolescence, with few disorders seeming more perplexing (Rapin, 1997). The three core features of abnormal communicative development, abnormal social development, and the presence of restricted interests and repetitive activities are utilized in the diagnosis of Autistic Disorder (Baron-Cohen & Hammer, 1997). Autistic Disorder as stated in The Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition DSM-IV [American Psychological Association (APA), 1994] falls under the umbrella of Pervasive Developmental Disorders. Pervasive developmental disorders (PDDs) are a group of disorders first diagnosed in childhood which are characterized by deviance and specific delays in communication, socialization, and cognitive development that develop during the first years of life (Volkmar, Klin, Maras, & Cohen, 1997). Children with autism are described as

demonstrating more interest in the nonsocial environment than the social realm (Volkmar et al., 1997).

A number of factors seem to play a role in the etiology of autism yet biological factors appear to be prominent in the pathogenesis of autism (Cammisa & Hobbs, 1993). Little consensus regarding which factors play the most important role presently exists and whether it is even plausible to attribute a causal role to any factor or set of factors remains to be determined (Cammisa & Hobbs, 1993). However in acknowledging all of the genetic and biological pieces related to the expression of autism, along with developmental atypicalities and neurological abnormalities found in varying research studies, scientists and practitioners alike seem to agree that autism is a neurodevelopmental disorder of childhood.

Gender differences exist in autism as approximately three to five times more males than females are diagnosed with the disorder (Klinger & Dawson, 1996). Although girls appear to be affected at a lower rate, the females diagnosed are more severely cognitively affected than males (Cicchetti & Cohen, 1995). According to Lord, Schopler, and Revicki (1982) reasons for such difference remain obscure and are likely genetic in origin.

Although the cognitive ability of individuals with autism varies greatly, the majority of the population (i.e. 70-80 %) functions within the mentally retarded range (Bryson, Clark, & Smith, 1988). The existence of a comorbid diagnosis of Mental Retardation (DSM-IV; American Psychiatric Association, 1994) along with an existing medical illness, such as epilepsy or phenylketonuria, and other diseases are appearing more frequently in this population (Volkmar et al., 1997).

As stated previously, impairments in cognition, social abilities, language capabilities, and behaviours exist in children with autism. For instance, cognitive difficulties in relation to the use of symbolic play, the comprehension of abstract concepts, and executive functioning are commonly observed (Gordon & Barker, 1994). Social abnormalities including deviancies in social imitation, emotional perception, and social cognition are viewed as central to Autistic disorder (Bacon, Fein, Morris, Waterhouse, & Allen, 1998). Speech and language challenges are marked by numerous deviancies in areas such as echolalia, abnormal prosody, and pronoun reversal (Wenar, 1994) and approximately half of all children with autism remain mute throughout their life span (Klinger & Dawson, 1996). Stereotyped patterns of behaviors, interests and activities such as preoccupations with a particular pattern of interest that is abnormal in either intensity or focus, an inflexible adherence to specific, nonfunctional routines or rituals, stereotyped and repetitive motor mannerisms, or a persistent preoccupation with specific parts of objects are also a significant part of the child's symptoms (APA, 1994).

Current follow-up studies suggest that the outcome for children with autism is variable (Stone, Maclean, & Hogan, 1995; Yarnell, 2000), as many factors appear to play a role in the course of the disorder (Lord & Paul, 1997). The age of a child's first word, along with measured intelligence appear to be significant prognostic factors in outcome (Lotter, 1978; Waterhouse, Wing, & Fein, 1989). In relation to treatment, support continues to exist for the need for early diagnosis and intervention (Azar, 1999; Lovass, 1987). Dawson and Osterling (1996) reported that the ability to recognize the disorder at a very early age is one of the more exciting recent

achievements in autism research. Diagnosis at a young age increases the likelihood that autistic symptoms will be addressed during a child's early neurodevelopmental period in the hopes of affecting maladaptive biological patterns of functioning. In relation to treatment, the best available evidence presently directs researchers and practitioners to the importance of appropriate structured educational interventions to foster the acquisition of basic communicative, social, and cognitive skills (Volkmar et al., 1997).

Attachment in Autism

Originally it was assumed that children with autism did not form attachments to their primary caregivers (Klinger & Dawson, 1996). However researchers have recently found that children with autism do show differential responses to attachment figures (Dissanayake & Crossley, 1997; Shapiro, Sherman, Calamari, & Koch, 1987; Sigman & Mundy, 1989; Sigman & Ungerer, 1984a). Such research studies examined the quality of parent-child attachments in children with autism. Capps, Sigman, and Mundy (1994) demonstrated that disoriented and disorganized attachment behaviors were displayed by their sample of children with autism if the autistic behaviors are ignored while other researchers have demonstrated that they display attachment styles similar to a normative age-matched population (Rogers, Ozonoff, & Maslin-Cole, 1991; 1993). Various methodological issues (e.g., difficulties establishing adequate comparison groups that demonstrate the range of deficits displayed by children with autism) complicate the interpretation of such empirical findings (Rogers et al., 1991) as the uniqueness of Autistic Disorder makes comparisons to other groups considerably challenging. Developmental deviations inherent in Autistic Disorder

would seemingly disrupt the course and use of these attachment behaviours. The complex interplay between social and language abnormalities and overall developmental deviancy (Fein, Pennington, & Waterhouse, 1987; Hobson, 1989; Volkmar, 1987; 1996) is also likely to impact a child's use of the primary caregiver as a secure base, namely the quality of attachment style demonstrated.

Present Study

The present study was designed to explore variables related to secure base behaviour in children with autism including social skills, communication capabilities, and interests/behaviours. The primary research question examined possible differences between two groups, a younger group (ages 24-36 months), and an older group (37-59 months). It was predicted that significant differences exist in children with autism's use of a secure base.

When investigating specific variables, three secondary research questions were examined within each of the domains of communication, socialization, and interest/behaviours. Secondary research question one examined the communication skills of social vocalization, reciprocal conversation, talk expressing interest in others, communicative speech, and pointing to express interest in relation to secure base behaviour. In secondary research question two the social milestones of direct gaze, social smiling, greeting, showing and directing attention, separation anxiety, and sharing other's pleasure and excitement were investigated in regards to a child's demonstration of a secure base. In the domain of interests/behaviour secondary research question three explored unusual preoccupations, difficulties with minor changes in subjects own routines or personal environment, compulsions and rituals,

and unusual attachment to objects in relation to a child's use of a secure base. Secure base behaviour was measured by the Autism Diagnostic Interview – Revised (ADI-R).

Prior to discussing the present study in more detail, general information regarding the syndrome of autism is presented. A discussion of historical perspectives, diagnosis and related issues, associated disorders, epidemiology, gender differences, etiology, course, outcome factors is offered. An overview of attachment theory follows along with a discussion of attachment in relation to autism as a rationale for the present study.

Chapter Two

Literature Review

Historical Perspectives

Henry Maudsley (1867) is known as the psychiatrist who first paid close attention to young children with a marked delay, deviation, and distortion in developmental processes (cited in Kaplan & Sadock, 1991). Autism originating from the Greek word "autos", meaning "self", represented Kanner's observation of children who appeared to be isolated from others and from things outside of themselves. Kanner (1943) first coined the term "infantile autism," which Bleuler (1950) later modified, using the term "autism" on its own. Kanner (1958) then went on to present a strong argument regarding the specificity of infantile autism and the unique cluster of symptoms. In addition, he maintained that infantile autism was a disease "sui generis" (i.e., of genetic basis) and he received considerable support for his views from other researchers in the field (Kanner, 1958, cited in Prior, Perry, & Gajzago, 1975).

Diagnosis and Related Issues

Over time the definitions and descriptions of autism have been modified and refined in the light of new research findings (Marcus & Stone, 1993). Clinicians and researchers have now attained consensus on the validity of autism as a diagnostic category, as well as on the various features central to its definition (Rutter, 1996). This consensus has made possible the development of the two major diagnostic systems, DSM-IV (APA, 1994, see Appendix A) and the World Health Organization (WHO) International Classification of Diseases (ICD) (WHO, 1993). Both of these

systems of diagnostic classification are very similar in their characterization of autism. North American institutions tend to utilize the DSM-IV (APA, 1994) versus the ICD-10 (WHO, 1993), which seems to be used primarily in European countries and other parts of the world. According to Volkmar et al. (1997) the diagnostic criteria outlined in DSM-IV (APA, 1994) are historically continuous with previous definitions of autism.

Presently several diagnostic instruments are used by professionals in conjunction with the DSM-IV (APA, 1994) diagnostic manual (Pilowsky, Yirmiya, Shulman, & Dover, 1998). Psychometric measures such as the Autism Diagnostic Interview-Revised (Lord, Rutter, & Le Couteur, 1994), Childhood Autism Rating Scale (Schopler, Reichler, & Renner, 1988), the Autism Diagnostic Interview (Le Couteur, et al., 1989; Wing & Gould, 1978) and the Autism Behavior Checklist (Krug, Arick, & Almond, 1980) may be employed separately or in conjunction when addressing the issue of diagnosis. A present concern related to diagnostic tools and instruments lies in differences which exist across these measures, and how such differences affect research findings when a variety of measures are used. That is differences in reliability and validity of measures and the actual constructs they measure may confound comparison of research studies, such as research conducted in the evaluation of symptomatology or treatment progress for instance.

Diagnosticians presently have the ability to recognize Autistic Disorder at a very early age as it has been found that autism may be diagnosed as early as 18 months (Dawson & Osterling, 1996). Recently Baron-Cohen, Allen, and Gillberg (1992) developed an instrument for the early screening of autism called the Checklist

for Autism in Toddlers (CHAT). In 1996, Baron-Cohen, Cox, Baird, Sweetenham, and Nightingale utilized the CHAT in screening 16,000 children during an 18-month routine developmental checkup. Twelve children failed the CHAT items which required protodeclarative pointing, gaze-monitoring, and pretend play. Of these 12, 10 were subsequently diagnosed with autism. When these 10 children were reassessed at three and a half years of age their diagnosis of autism was maintained. The findings of such research are groundbreaking and offer much insight into the development of autism. Specifically the identification of developmental markers appears to serve as clues to the enigma of the disorder. With such clues researchers can better comprehend potential causes and possible cures for autism [University of California-Davis Medical Investigation of Neurodevelopmental Disorders (M.I.N.D.) Institute, 2001].

Pervasive Developmental Disorders are also referred to as Autistic Spectrum Disorders and include Autism, Asperger Disorder, Childhood Disintegrative Disorder, Rett Disorder, and Pervasive Developmental Disorder (Not Otherwise Specified) (DSM-IV, APA 1994). According to Szatmari (1996), the other Autistic Spectrum Disorders differ from autism in that they lack specific types of behaviors, have fewer symptoms, and have a different age of onset and course. However debate on the qualitative differences between particular Pervasive Developmental Disorders continues to exist as current research suggests few substantive distinctions between high-functioning autism and Asperger Syndrome (Lord, Rutter, & Le Couteur, 1994). In a recent article, Ozonoff and Miller (2000) argue that Asperger Disorder may actually be "high-IQ autism" and that separate names for these two disorders may not

be warranted. Making differential diagnoses within the area of Pervasive Developmental Disorders is problematic enough, as the qualitative oddities present in this population are not, at times, easily identifiable in clinical assessment. Given such controversies, professional practitioners remain cognizant of the difficulties which exist in utilizing present DSM-IV criteria and explore the use of diagnoses in a manner which augments the treatment process when specific autistic symptoms are identified.

Associated Disorders

Present research indicates that 75% of persons with autism present with some degree of mental retardation (Volkmar et al., 1997). Mental retardation refers to substantial limitations (manifesting before the age of 18) in current functioning, which is characterized by significantly subaverage intellectual capabilities. Functioning exists in tandem with associated limitations in two or more of the adaptive skills areas of communication, home living, self-care, community use, social skills, self-direction, functional academics, health and safety, work, and leisure (American Association on Mental Retardation, 1992). Such comorbidity may present as an assessor with some diagnostic confusion, given the multiple impairments inherent in Autistic Disorder, along with those associated with a diagnosis of Mental Retardation (DSM-IV; APA, 1994). When the existence of both of these conditions is determined through rigorous testing, clinical observations, and related diagnostic methods, what also remains is the fact that, along with Mental Retardation, autism has also been associated with a number of other disorders of childhood such as developmental language disorders (Cicchetti & Cohen, 1995), Tourette's Disorder (Wing, 1997), and obsessive-compulsive disorder (Wing, 1997). Furthermore medical syndromes related with

autism include: a) phenylketonuria (PKU) (Folstein & Rutter, 1987), b) Fragile X syndrome (Bolton & Rutter, 1990; Rutter, McDonald, Le Couteur, & Harrington, 1993), c) Landau-Kleffner syndrome (Wolf-Schein, 1996), d) tuberous sclerosis (Gutierrez, Smalley, & Tanguay, 1998; Smalley 1992), e) neuronal ceroid lipofuscinosis (Taft, 1993), f) Lesch-Nyhan syndrome (Taft, 1993), g) hypsarrhythmia or infantile spasms (Taft, 1993), h) lactic acidosis (Coleman & Blass, 1985), i) Duchenne muscular dystrophia (Komoto, Udsui, Otsuki, & Terao, 1984), j) Williams syndrome (Reiss, Feinstein, Rosenbaum, Borengasser-Caruso, & Goldsmith, 1985), k) asthma (Baron & Dondey, 1993) and l) epilepsy (Wong, 1993; Gillberg, 1991). The frequency of these comorbid disorders is variable yet it is clear that there are many layers to unravel in the assessment of autism. With multiple psychological and neurodevelopment challenges presented in the examination of this population, psychologists are bound to employ the resources of medical professionals in order to better comprehend the nature and presentation of Autistic Disorder.

The issue of comorbidity and autism has become increasingly important in recent years (Volkmar, Klin & Cohen, 1997). With any serious disability comorbid medical illnesses seem to increase the risk for other problems (Volkmar et al., 1997). For instance Rapin (1997) reported that approximately 10 percent of children with autism have an EEG pattern of the type seen in Landau-Kleffner syndrome, an acquired epileptic aphasia. This EEG pattern, as also seen in individuals with disintegrative disorder, has been associated with a particularity poor outcome (Rapin, 1997). As well early onset seizures and adolescent onset seizures have also been

associated with autism (Gillberg, 1990; Wong, 1993) and individuals with such comorbidity have a poorer outcome (Gillberg, 1990).

Another example of the relationship between comorbidity of medical illness in autism and prognosis is neuronal ceroid lipofuscinosis, a neurodegenerative disorder of childhood. Infants with this disorder develop seizures, visual failure, and a delay in the growth of the head. Prognosis in these children is extremely poor. According to Taft (1993), "most children continue to regress in motor skills, and after a few years, are in a vegetative state intellectually." (p 182). Given that neuronal ceroid lipofuscinosis is associated with autism, it appears likely that children with such comorbidity have an increased likelihood of poorer prognosis. Therefore with the number of associated medical conditions linked with autism, outcome seems dependent on this variable, as comorbid medical illness reduces the likelihood of a better outcome.

Epidemiology

"Epidemiological research serves both practical and theoretical purposes. It not only reveals the prevalence of a disorder, but also its course, outcome, and occasionally information regarding the underlying etiology and neuropsychopathology" (Bryson, 1997, p 41). Epidemiological studies estimate the prevalence of autism to be 2-5 per 10,000 individuals (APA, 1994). The Autism Society of America (1995) reports that Autistic Disorder occurs in approximately 15 out of every 10,000 births. More recent work approximates the prevalence rate of autism at 10 cases per 10,000 (Volkmar et al., 1997). According to Wolf-Schein (1996), prevalence rates vary according to the definition employed as Fombonne

(1997) recently indicating that the prevalence rates vary from 0.7-15.5 per 10,000 depending on whether the entire "autistic spectrum" is included or not.

Gender Differences

According to Dawson and Klinger (1996) three to five times more males than females are affected with autism. Taylor and Ounsted (1972) delineated that with uneven sex ratios, the lower prevalence sex tends to be relatively more cognitively severe. As such, when girls are affected, they are reported to have a more severe form of autism (Cicchetti & Cohen, 1995). Konstantareas, Homatidis, and Busch (1989) indicated that nonverbal IQ and mental age tend to be higher in males with autism. In addition affected boys tend to evidence superior performance in the areas of operational causality, object permanence, receptive language, peer interaction, imitation of invisible movement and unfamiliar configurations, and the ability to verbalize. Additionally Bryson et al. (1988) reported that none of the girls in their study demonstrated an IQ of more than 70. Others have documented that among the severely mentally retarded children with autism girls are almost as frequent as boys, yet "high-functioning" girls are exceedingly rare (Steffenburg & Gillberg, 1989; Tsai & Beisler, 1983; Tsai, Stewart, & August, 1981). Taken together the empirical evidence supports the relationship between gender and the severity of autism. Difficulties arise in the examination of the presented literature however in that the number of females included in gender studies remains minimal. The use of large equal size groups to rigorously examine gender differences has been virtually undocumented in the literature of autism.

Etiology

Autism is a behavioral disorder of unknown etiology (Piven, Simon, Chase, & Wzorek et al., 1993). Because the syndrome is defined by history, onset, and behavioral criteria, it has been thought of as an etiologically heterogeneous disorder (Coleman & Gillberg, 1992). Moreover it has been demonstrated that no single theory has the explanatory power necessary to address the complexity of the disorder and to date, a single causal pathway has not been discovered (Dawson, 1992). However possible genetic, pre-, peri-, and neonatal complications, biological and neurological explanations of the disorder, as well as psychodynamic theories of its origin, have been postulated (Klinger & Dawson, 1996).

Genetic explanations. Both twin and family studies suggest that genetic factors play a considerable role in the etiology of autism (Wenar, 1994). According to Baron-Cohen & Robertson (1995) the risk for autism increases substantially in identical twins and biologically related siblings of individuals diagnosed with autism. In epidemiological studies of siblings, the pooled frequency of Autistic Disorder was approximately 3% which is 50 times greater than the expected prevalence rate (Popper & Steingard, 1996; Smalley, Asarnow, & Spence, 1988). According to Popper and Steingard (1996), about 5% to 25% of siblings of autistic individuals evidence delays in learning (usually associated with language and speech), mental retardation, or physical defects. Higher rates of social and communication deficits, along with stereotyped behaviours emerge in families with autism (Bolton, MacDonald, & Pickles, 1994). Family studies also indicate that autosomal recessive inheritance may exist for certain cases of autism (Popper & Steingard, 1996).

Chromosomal abnormalities resulting in several specific genetic disorders have also been associated with autism (Yeung-Courchesne & Courchesne, 1997). Fragile X syndrome, tuberous sclerosis, and phenylketonuria (PKU) are three genetic disorders which have been reported to co-occur with autism. Fragile X syndrome has been found in approximately 8% of individuals with this disorder (Smalley, Asarnow, & Spence, 1988). The rates of other disorders such as tuberous sclerosis and PKU are also quite minimal (Folstein & Rutter, 1987) and therefore cannot account for the etiology of autism. On the whole what remains to be determined is which aspects of autism are heritable and how the genetic information is translated into autistic behavior (Wenar, 1994).

Pre-, peri-, and neonatal complications. A number of studies have shown a relationship between pre-, peri-, and neonatal factors and autism. Significant associations have been made regarding a higher-than-expected number of risk factors contributing to diagnosed infants (Dawson, 1992; Tsai, 1987). However challenges evident at birth are more firmly related to problems in the fetus rather than to labor and delivery complications (Volkmar et al., 1997). Tsai (1987) determined that bleeding after the first trimester, use of prescription medication, meconium in the amniotic fluid, and a maternal age greater than 35 years were seen significantly more frequently in children with autism as compared to normally developing controls. Other researchers have found differing results demonstrating that only a gestational age greater than 42 weeks and birth order (first, fourth, or later than fourth) were associated with autism (Lord, Mulloy, Wendelboe, & Schopler, 1991). Furthermore, neonatal convulsions and other biological hazards carrying the potential risk of brain

damage have been shown to differentiate children with autism from their non-affected twins (Wenar, 1994). Taken together these results demonstrate that pre-, peri-, and neonatal factors associated with autism are relatively unspecific and of uncertain significance (Rutter, Macdonald, le Couteur, & Harrington, 1993).

Biological explanations. Kanner (1943) suggested that autism was an endogenous form of psychopathology brought about by deficiencies in the biological systems responsible for the regulation of affective contact with others. He also proposed that children with autism suffered from a biologically based disorder of affective systems which resulted in severely disturbed patterns of social development. At present research continues to focus on neurobiological theories of autism and autistic-like conditions (Gillberg, 1990).

Arguments continue to be made for probable differences in the neurobiology and biochemistry of children with autism (Fein, Pennington, & Waterhouse, 1989). Researchers have examined serotonin, dopamine, norepinephrine, brain opiods, peptides, and other compounds in individuals with autism (Yeung-Courchesne & Courchesne, 1997). Compared to controls, persons with autism tend to evidence elevated serotonin levels, monoaminergic system and opiod functioning abnormalities, abnormal plasma B-endorphin levels, elevated T3 and T4 levels, and unmodulated plasma growth hormone responses to insulin-induced hypoglycemia (Yeung-Courchesne & Courchesne, 1997). However consistent results across studies have not yet been attained (Volkmar & Anderson, 1989).

Neurological explanations. Rimland (1964) and Schopler (1971) were the first researchers to postulate a neurological impairment as a potential etiology of the

disorder. Presently neuroanatomical findings suggest potential differences in particular areas of the brain such as an enlargement of the fourth ventricle, (Gaffney, Kuperman, Tsai, & Minchin, 1987), diminished cerebellum size (Courchesne, Yeung-Courchesne, Press, Hesseklink, & Jernigan, 1988), abnormal EEG patterns (Yeung-Courchesne & Courchesne, 1997), and hyper-or hypofrontality, atypical asymmetries in temporal and frontal lobes and basal ganglia (Buchsbaum, Siegel, Wu, Hazlett, Sicotte, et al., 1992). In addition autopsies of children with autism have revealed abnormal cerebellum development (Ritvo, 1986). Malfunctions of the cerebral cortex (Yeung-Courchesne, 1993; Piven, Berthier, Starkstein, Nehme, Pearlson, & Folstein, 1990) have also been identified. Courchesne, Karns, Davis, Ziccardi et al. (2001) suggested that unusual development of neuroanatomic phenotype (outward expression of genetic make-up) characterized by hyperplasia of cerebellar white matter, cerebral white matter, and neocortical gray matter in young children demonstrates retarded growth.

Examination of the neurological findings associated with autism is complex. In understanding the aforementioned details it is important to note that the present findings point to abnormalities in the development and regulation of brain growth in this population. However results have rarely been replicated and consistent patterns of neuropathology have not been achieved (Wenar, 1994). What is evident is the notion that much evidence presently exists to consider autism a neurodevelopmental disorder, as the current literature appears to be emphasizing the neurological impairments associated with Autistic Disorder. With that being said it seems that although

etiologically mysterious in its course and presentation, autism can be viewed as a neurological disorder with developmental and psychological underpinnings.

Psychological explanations. Other theories regarding the "cause" of autism have suggested the existence of parental psychopathology or what Bettelheim (1967) termed as "the refrigerator mother." To be more specific Bettelheim (1967) proposed that in response to rejecting parents (typically mothers) children with autism withdrew from social interaction. According to Bettelheim (1967) "autism has essentially to do with everything that happens from birth on" (p. 393). That is he believed that autism typically stemmed from maternal rejection. Tinbergen and Tinbergen (1983) suggested that autism was caused by an "anxiety dominated emotional imbalance" leading to social withdrawal and the inability to learn from social interaction. Tinbergen and Tinbergen (1983) also remarked that this imbalance was a result of a lack of bonding between mother and child.

Rogers, Ozonoff and Masline-Cole (1993) reported that the notion of autism as an attachment related disorder should be put to rest, as children with autism have been found to demonstrate differential attachments to their caregivers. Differences in the way in which the child views his or her mother and develops an inner working model of the caregiver may be unique, however, and not resemble that of a typical child (Rogers et al., 1993). Given the lack of empirical support these psychodynamic explanations of causation have been subsequently rejected (Klinger & Dawson, 1996). Although it is true that abnormalities in child rearing may lead to difficulties in social behavior, the nature of the social abnormalities found in children with autism do not

resemble those identified in normative samples or other clinical populations (Rutter & Schopler, 1987).

In summary it is clear that a number of factors may play a role in the etiology of autism. However Cammisa and Hobbs (1993) argue that biological factors appear to play a significant and a seeming dominant role in the pathogenesis of autism. Little consensus regarding which factors play the most important role exists and whether it is even plausible to attribute a causal role to any factor or set of factors remains to be determined (Cammisa & Hobbs, 1993).

At this point it is important to consider the specific deficits associated with autism. Research has consistently demonstrated that individuals with autism display qualitative impairments in the collective triad of cognitive abilities, communication skills, and social abilities. Moreover, there is empirical evidence of the repetitive behaviors and restricted interests associated with the syndrome. In the sections that follow, the deficits associated with autism are examined in detail and a discussion of prognosis in autism is provided in relation to each of the atypicalities outlined.

Deficits Associated with Autism

Cognitive abnormalities. Kanner (1943) initially suggested that children with autism exhibited normal levels of intelligence because of their relatively superior performance on certain parts of traditional tests of intelligence (cited in Volkmar et al., 1997). The assumption was then made that if these children could score in the normative range on specific subsets and were motivated to do so, they would also be able to evidence normal performance on other areas of the IQ test. Subsequently homogeneity in cognitive ability was believed to exist in individuals with autism

(Szatmari, 1996). Kanner's (1943) assertion that children with autism had a normal cognitive potential was later demonstrated to be inaccurate (Rutter & Schopler, 1987; Volkmar, 1997).

Following Kanner's assertions of normal cognitive potential, it was suggested that individuals with autism experienced difficulties with higher-order thinking. For instance Piaget (1954) suggested that children with autism had difficulties with assimilation (cited in Wenar, 1994); that is Piaget (1954) suggested that they were not able to relate new information to past experiences and they tended to "echo" rather than understand (cited in Wenar, 1994). Consequently Piaget (1954) delineated that autistic thought processes were concrete and situation specific. Others (e.g., Dawson, 1992) have postulated that autistic individuals have difficulty coding and organizing stimuli. Dawson (1992) demonstrated that children with autism have perceptual processing deficits and consequent deficits in task completion. According to Frith and Baron-Cohen (1987) children with autism attempt to compensate for their coding and organization deficits by engaging in stereotyped behaviors to establish stability and predictability in a significantly overwhelming environment. Moreover children with autism tend to use a rule-based approach when presented with tasks involving categorization (e.g., all dogs have long tails). To be more specific they do not appear to use a summary representation or prototype approach to categorization (Klinger & Dawson, 1996) (e.g., fish have gills and live in water).

Difficulties with verbal and nonverbal symbols also pose challenges to the autistic child. Symbols represent certain objects or concepts. According to Wenar (1994) the important functions of symbolization are as follows: 1) Symbolization

allows the child to be released from a reliance on action. For instance "the act of walking up the stairs can be represented by the thought "I can walk upstairs;" 2) Symbolization replaces trial-and-error behavior; and 3) Symbolization opens the door to abstractions that have no specific referent in concrete reality, such as "right" and "wrong." In terms of symbolic play clear differences exist between children with autism and age-matched groups of typically developing peers in both highly structured play interactions and free play activities (Dawson, 1992). For instance Sigman and Ungerer (1984) demonstrated that the functional or purposeful play and free play (relatively unstructured) behaviors of children with autism were less diverse than those of typical peers. Differing from children with mental retardation, children with autism were unable to utilize a doll as an independent agent of action (to attribute animate characteristics to the doll) (Dawson, 1992).

Another specific cognitive deficit associated with autism is the failure to develop the ability to "predict and explain the behavior of other humans in terms of their mental states" (Cicchetti & Cohen, 1995, p 363). According to Bering (2002), "autism is a developmental disorder that seems to impair that specific nexus of social-cognitive skills that are guided by theory of mind" (p.13). The 'theory-of-mind' hypothesis (Baron-Cohen, 1985) postulates that children with autism are specifically impaired in their ability to understand that other people have desires, beliefs, and intentions that are different from their own. Jarrold, Butler, Cottington, and Jimenez (2000) described the relationship between theory-of-mind and central coherence (i.e. the normal tendency to amalgamate local information in the hunt for global meaning). Jarrold et al. (2000) stated that individuals with autism are more likely to focus on a

local rather than global level. Happe (1997) articulated that theory-of-mind impairment negatively impacts the developing child's imagination, communication, and social abilities. Similarly Baron-Cohen (1985) theorized that a core metarepresentational deficit which involves a lack of awareness of the intentional relations between other people and the world (Dawson, 1989) was responsible for communication and social deficits observed in autism.

According to Klinger and Dawson (1996) the memory impairments of autistic individuals tend to vary depending on their level of functioning. For high-functioning individuals impairments are typically observed on tasks which require long-term memory, abstract thought, and/or the ability to attain strategies for encoding complex information. The areas of impairment in low-functioning individuals include short and long-term memory and declarative memory (Klinger & Dawson, 1996). Furthermore, Delong (1992) suggested that the memory deficit in autism was a result of an impairment in memory management precipitated by hippocampal damage. The results of such a deficit according to Delong (1992) limit the individual with autism to stimulus-response type behaviors as access to memory systems is cut off. Some researchers also report that individuals with autism do not suffer from gross memory deficits (Sigman, 1989). That is there is empirical support that individuals with autism exhibit adequate memory functioning in some areas. Such areas include visuospatial organization, sustained attention, paired associate learning, auditory rote memory, cued recall, discriminate learning, and operant learning (Klinger & Dawson, 1996).

Lastly impairments in executive functioning have also been discussed in the literature. According to Rapin (1997) executive function is "the ability to consider

alternatives in planning" (p. 856). Executive functioning requires a variety of skills including the ability to keep a number of items in working memory, allocate attention to competing stimuli, balance priorities, weigh the consequences of alternative courses of action, consider available resources realistically, and think of possible options before taking action (Rapin, 1997). Research has consistently demonstrated that individuals with autism display impaired performance on executive-function tasks (Klinger & Dawson, 1996). Essentially such limitations seem to perpetuate inflexibility in children with autism. A lack of alternative choice-making abilities in this population may promote a rigid way of problem solving, behaving and thus interacting with the environment.

Taken together the cognitive abnormalities associated with autism are extensive and complex (Dawson, 1992). Although some specific memory systems are intact (e.g., auditory rote memory) and even phenomenal in some cases, difficulties with symbolic play, the comprehension of abstract concepts, and executive functioning are commonly observed (Gordon & Barker, 1994).

Next in the examination of cognition and outcome, it has been demonstrated that measured intelligence (i.e., IQ) is a powerful predictor of prognosis in autism. Waterhouse, Wing, and Fein (1989) delineated that it is often the case that children with autism with higher IQs have a generally better prognosis than do children with lower IQs. However this does not necessarily mean that there are two IQ separable subgroups (i.e. above or below an IQ of 50) of children with autism. It only suggests that "being in the top half of the IQ distribution is beneficient for later outcome"

(Waterhouse et al., p. 269). In addition Stone, MacLean, and Hogan (1995) reported that higher functioning individuals (i.e. IQ> 60) achieve more favorable outcomes.

IQ has also been found to be related to the presence of useful speech before the age of 5 (Lotter, 1978). The lower the IQ (i.e. the more severe the mental retardation), the less likely the child with autism is to develop speech. According to Lotter (1978) lower IQ is associated with "a lesser likelihood of developing useful speech and a poor outcome." (p. 483). Lotter (1978) suggested that a combination of speech and IQ may be more useful when exploring prognosis rather than examining each variable separately. It is also important to note that Volkmar (1996) indicated that the importance of IQ to outcome is not specific to autism. IQ is also critical in the outcome of other forms of child psychopathology such as mental retardation.

Measured intelligence in individuals with autism has also been examined in relation to the severity of the disorder and the level of adaptive functioning. Recent studies have generally found severity of autism, IQ, and adaptive functioning to be closely related. Rumsey, Rapoport, and Sceery (1985) determined that adaptive functioning increased with IQ. However Schatz and Hamdan-Allen (1995) were unable to significantly support these findings. Thus it appears that IQ may be closely associated with severity but the extent to which IQ is associated with adaptive functioning in autism is yet to be determined.

Social abnormalities. Social unrelatedness is considered the hallmark of Autistic disorder (Fein, Pennington, & Waterhouse, 1987). Hobson (1989) proposed that children with autism are profoundly impaired in their personal relations. Although they are often the most handicapping of the core impairments, the social

deficits associated with autism have been the least documented (Lord, 1993). In the social domain, impairments in social imitation, emotional perception, social cognition, and attachment have been reported (Klinger & Dawson, 1996). The following section will address such impairments excluding the area of attachment. A discussion of attachment and autism is presented as a separate section in this chapter.

It has been suggested that children with autism have a specific impairment in their ability to imitate the behavior of others in their environment (Sigman & Ungerer, 1984b). Difficulties with motor and vocal imitation have been well documented (Lord, 1993). Smith and Bryson (1994) suggested that the imitative delays observed in individuals with autism might be due to their incapacity to perceive and represent events. Others have proposed that the imitative deficits of children with autism may interfere with the development of other critical social skills such as reciprocity, the understanding of emotional states and joint attention (Dawson, 1990; Meltzoff & Gopnik, 1993). For example Leekam, Lopez, and Moore (2000) stated that joint attention (focusing attention with another person on something in particular) difficulties in autism are found in adult-child relationships, and triadic (child-adult-object) dynamics.

In reference to emotion and affect there is much research to support the notion that typically developed infants appear to be preprogrammed to recognize emotions in others, and to use emotion as an early form of communication. In contrast to such infants children with autism appear to view the world of emotions as foreign (Walters, Barrett, & Feinstein, 1990). According to Sigman and Mundy (1987) positive affect (e.g., happiness, joy) is not displayed as frequently by children with autism. Dawson

(1990) also suggested that these children are less likely to combine smiling with eye contact, and are less likely to smile in response to mothers' smiles. Other studies that examined the ability of individuals with autism to match photos on the basis of facial affect (Fein & Waterhouse, 1987) have also demonstrated deficits in emotional understanding. Contributing to abnormalities in affect are the impairments in eye gaze, joint attention, and the desire to attract other's attention (Sigman, 1989). Charman, Sweettenham, Baron-Cohen, Cox, Baird, and Drew (1997) found that children with autism were delayed in their use of empathy (the ability to put oneself in or understand someone else's position), joint attention and imitation when compared to delayed and typically developing children. For instance, children with autism failed to use social gaze in empathy and joint attention tasks (Charman et al., 1997). Taken together these findings suggest that autistic individuals are impaired in both their ability to produce and their ability to understand emotional expression.

As mentioned earlier, the cognitive deficits associated with autism are thought to be directly related to the social abnormalities observed (Walters, Barrett, & Feinstein, 1990). According to Shah and Wing (1986), the social deficits in autism tend to be a function of the level of cognitive functioning. Sigman and Mundy (1987) also postulated that the inability to transform information to a symbolic level might derive from a lack of social interest. It has also been suggested that the incapability to encode meaningful stimuli, a failure to take meaningful context into account, a lack of inner language, and lack of internal conceptual structures contributes to their social difficulties (Walters et al., 1990).

In summary, severe social abnormalities exist in children with autism. These abnormalities which include social imitation, emotional perception, and social cognition are viewed as central to the disorder (Bacon, Fein, Morris, Waterhouse, & Allen, 1998). Considering that autism represents a fundamental failure in social relatedness, research continues to elucidate the nature of the deficit and to account for the complex interplay observed between social, cognitive, and communicative deficits (Grossman, Carter, & Volkmar, 1997). This presentation of social deficits is interwoven with both cognitive and language delays and abnormalities.

In relation to outcome, level of social interest and ability to interact with others also appears to be associated with prognosis in autism (Volkmar, 1996). According to Volkmar et al. (1996) styles of interaction are closely related to developmental level. Lord (1993) examined the social skills of children with autism over several years and found that these skills tended to improve as chronological age increased. In 1979, Wing and Gould categorized children with autism into three groups based on their socialization abilities. These classifications were described as "aloof", "passive", or "active-odd." The "aloof" groups were characterized by children who did not initiate interactions with others and who reacted negatively when others attempted to initiate interactions with them. The "passive" group included children who were receptive when others attempted to interact with them, but did not initiate social interactions on their own. Finally the "active-odd" group initiated social interaction, but did so in an odd or idiosyncratic manner. Wing and Gould (1979) found that the "aloof" group was associated with lower cognitive abilities (e.g., intelligence) and more severe cognitive impairments (e.g., higher order functioning). As they grow older, aloof

children tended to progress to being passive or active-odd. Moreover it was noted that regression within the social domain was rare. That is children with autism do not typically move from being passive to aloof. Thus some empirical evidence exists in support of the contention that socialization capabilities are associated with outcome in autism (Popper & Steingard, 1996).

Socialization in relation to familial relationships and factors related to the home environment may also impact prognosis in autism. To clarify Harris (1994) reported that the manner in which a family responds to a child with autism has the potential to influence both the child's manifestation of behavior problems and the child's educational gains. According to Paul (1987) the presence and involvement of family members would appear to be logically related to outcome. Having a dysfunctional and disorganized family, or a clinically depressed parent may also create stress for the autistic individual in that it has the potential to lead to chaos in the home environment (Harris, 1994).

Stressful events may also produce challenging conditions for a child with autism. For instance divorce is a stressful experience for any child, which is usually preceded, and often followed by a period of interpersonal conflict (Wolchik, Sander, Braver, & Fogas, 1985). The Amato and Keith (1991) meta-analysis highlighted the negative impact of parental conflict on developing children. Interpersonal hostility creates an aversive home environment in which children experience unhappiness and insecurity (Maccoby & Martin, 1983). Conflict is also likely to place stress on parents and make them less effective in dealing with their children (Hetherinton, Cox, & Cox, 1982; Wallerstein & Kelly, 1980). Furthermore stressful events such as divorce may

disrupt children's school achievement, social relationships, and personality development, all of which have long-lasting implications (Amato & Keith, 1991).

Conversely the stress associated with caring for a child with autism has the potential to impact family functioning. According to Sanders and Morgan (1997) "a child with a severe handicap can have a profound impact on the family" (p 16). Such effects are not unidimensional, but multifaceted and reciprocal, altering the family unit as a whole (Harris, 1982). Chronic psychological stress is also hypothesized to manifest itself in family difficulties (Koegel Schreibman, O'Neill, & Burke, 1983). Sources of such stress may include the stigmatization associated with the disorder (Gray, 1993), difficulties in accepting the diagnosis (Harris, 1983), additional financial burdens (Holroyd & McArthur, 1976), loss of leisure time (Harris, 1983), fatigue associated with caring for the child (Harris, 1983; Sander & Morgan, 1997), and marital conflicts associated with rearing a child with developmental challenges (Harris, 1982; Holroyd & Mc Arthur, 1976).

Like all families, families with autism must learn to deal with challenging life events (e.g., death, illness in the family) (Harris, 1994). Thus it is imperative to "understand not only the specific sources of stress that these special needs families experience, but also how they cope with these demands, the factors that determine which families will respond more or less effectively to the stresses of their lives, and how their coping may impact the child's development" (Harris, 1994, p. 162).

Researchers have also examined family relationships in relation to outcome. For instance, Mathijssen, Koot, Verhulst, De Bruyn, and Oud (1998) investigated the correlation between family relationships and child psychopathology (including

children with autism) in a sample of 137 families referred to outpatient mental health services. Assessment of the relative association of the family dyads demonstrated that both the mother-child and the father-child relationship were related to child problem behaviors. Challenges in mother-child relationships were consistently more associated with externalizing problematic behaviors, while challenging father-child relationships were particularly related to internalizing behavioral concerns. These results give support to the idea that more negatively qualified relationships are associated with problematic behavior and conversely, positive parent-child interactions are related to behavior which is less challenging.

Along with parent/child interactions, sibling relationships are affected in families with a developmentally challenged child (Rodrigue, Geffken, & Morgan, 1994). It has been argued that having a brother or sister with a handicap does not invariably lead to a troubled sibling relationship, but significant developmental challenges may arise (Harris, 1994). Such difficulties include the frustration of dealing with an unresponsive brother or sister, the sacrifice of parental attention, discomfort caused by peer responses and disruption of family activities (Harris, 1983).

Although children with autism are seen as a source of stress to many parents, buffers may exist to assist a family in adapting to the special needs of their child. These include family cohesion, a good social support network, and effective coping skills (Harris, 1994). As such, an essential part of most intervention programs is to assist the parents in developing effective methods of coping with behavior problems (Howlin, 1989). According to Howlin (1989) "it is the long-term improvement in

family functioning that is the ultimate goal, not simply the short term alleviation of specific behavioral difficulties" (p 210).

Taken together it is clear that family factors have the potential to impact outcome in children with autism. Stress factors and familial relationships seem to affect a child's level of functioning, along with effective support systems. Unfortunately much remains unknown in this area, as more research needs to be conducted in relation to family and outcome. Which specific outcome family factors are related to Autistic Disorder needs to continue to be examined.

Communication abnormalities. Profound abnormalities in the development of communication skills and language abilities are a critical feature of autism (Pennington & Welsch, 1995; Sigman & Mundy, 1987). Difficulties with speech and language are marked by numerous deviancies in language such as echolalia (echoing sounds or another's words), abnormal prosody (flatness in speech tone), and pronoun reversal (e.g., mine versus yours) (Wenar, 1994). As well approximately half of all children with autism remain mute throughout their life span (Klinger & Dawson, 1996). Those who do develop oral language and/or conventional methods of nonverbal communication (e.g. gestures) generally continue to display delayed and/or deviant language abilities (Dawson, 1992). In addition children with autism differ in the quality and rate of their language development (Rutter, 1967).

According to Pennington and Welsch (1995), children with autism often fail to demonstrate communicative intent defined as the ability to use language for intentional purposes. Also impairments in the early development of joint attention and symbolic play significantly impact communication development as both of these

behaviors are considered to be precursors to language development (Klinger & Dawson, 1996). Limited flexibility in play and imagination may also contribute to the language deficits seen in autism (Wing, 1981). Likewise failing to develop verbal and nonverbal methods of communication, such as body language, gestures, facial expressions, and eye-to-eye gaze extremely limits the autistic child's ability to express thoughts and needs to others in this clinical population.

Geller (1998) suggested that a communication breakdown exists in children with autism. He postulated the existence of a breakdown in the speaker's response to the listener's request for clarification of his or her original message. Geller (1998) stated that the challenging issue in childhood autism is "to understand the synergistic relationship within and across social-cognitive domains... delays or difficulties in each domain of language clearly influence children's display of knowledge and effectiveness in responding to listener's needs" (Geller, 1998, p. 82). In general the primary function of language is to mediate social interaction. However given that the defining feature of autism is deviant social interaction, the vehicle of language is greatly hindered in the processes of functional communication (Pennington & Welsch, 1997). Rigidity and a lack of spontaneity seem pervasive in the presentation of autism, greatly impacting language capabilities.

Overall it appears that children with autism experience both delays and deviancies in the development of speech and language and in the use of verbal and/or non-verbal communication. Such challenges significantly impact multiple facets of a child's developmental course with cognition and socialization being profoundly

affected by the development and use of verbal communication and nonverbal social language.

In examining communication abilities, it is also important to examine progress in verbal communication skills in relation to prognosis. According to Lotter (1978), the presence of functional language by age 5 was one of the most potent predictors of outcome in individuals with autism. Consistent with this research, Lord and Paul (1997) reported that achievement of useful expressive language by the age of 5 years was the most powerful predictor of both behavioral and vocational outcome. Moreover, Shapiro (1992) stated that, "if communicative speech is developed by the age of 5, there is a 50% chance for some social recovery" (p. 357). Fluency and flexibility of expressive language have also been found to discriminate between high and low-functioning individuals with autism (Lord & Paul, 1997). Further Popper and Steingard (1996) reported that more language skills were associated with a better prognosis, while Dawson (1992) stated that considerable gains in language abilities can affect cognitive, social and behavioral skills. Therefore progress in relation to social communication and communicative speech should be considered in reference to better outcome in children with autism.

Repetitive and stereotyped behaviors and interests. Children with autism often engage in abnormal, repetitive behaviors and display restricted interests (Klinger & Dawson, 1996). According to the DSM-IV (APA, 1994) these stereotyped patterns of behaviors, interests and activities are manifested by preoccupations with a particular pattern of interest that is abnormal in either intensity or focus, an inflexible adherence

to specific, nonfunctional routines or rituals, stereotyped and repetitive motor mannerisms, or a persistent preoccupation with specific parts of objects.

McBride and Panksepp (1995) defined stereotyped behaviors as non-functional, repetitious, self-stimulatory body movements. These behaviors are typically subsumed under such terms as "restricted range of interests" or "insistence on sameness" and encompass a diverse group of behavioral features (Volkmar, 1996). The most commonly reported repetitive behaviors include body rocking, swaying, toe walking, hand, finger or arm flapping, and whirling (Wenar, 1994). According to Nijhof, Joha, and Pekelharing (1998) these behaviors differ from compulsive behaviors in that they lack purpose. Furthermore in terms of repetitive interests, Klinger and Dawson (1996) report that perseverative (something one focuses on over and over again) interests typically involve memorization of facts about a specific subject area such as the solar systems, for example. Such oddities in behaviour appear to be related to other peculiarities presented in Autistic Disorder given that impairments in cognition, socialization, and communication functioning seem to significantly impact behaviour and the ways in which children with autism interact with the social world. The overall demonstrations of impairments in autism are not specifically contained in one domain of functioning. Rather they are global, resulting in impairments in virtually all domains. Perhaps this is due to the fact that development does not occur in a vacuum and the impact of multiple factors, both within the child and in his or her environment plays a critical role in developmental processes. The interplay of nature and nurture seem to complexly affect the

progressive sequelae of the developmental course, leaving he or she with a qualitatively odd behavioral presentation.

Course and Outcome

Relatively little research has examined the natural course of autism. The issue of prognosis in autism was first addressed by Lotter (1974) who began by exploring the factors related to outcome (cited in Lotter, 1978). Four years later Lotter reviewed all the studies which had addressed outcome in autism and categorized outcome using the following hierarchy: 1) good (normal or near normal social life and satisfactory functioning at school or work), 2) fair (some social and educational functioning, despite significant abnormalities in interpersonal relationships or behavior), 3) poor (i.e. no independent social progress and severe handicap), and 4) very poor (i.e., inability to lead any sort of independent existence). Five to 17% of Lotter's (1978) research sample was reported to fall into the good outcome category. Gillberg and Steffenburg (1987) introduced a fifth outcome category between Lotter's fair and poor termed "restricted but acceptable outcome." This group referred to those in the poor group who had been accepted by a peer group to the extent that their handicaps were not so apparently obvious (Gillberg & Steffenburg, 1987).

Other researchers utilizing cognitively heterogeneous samples have found higher rates of favorable prognosis than those previously reported by Lotter (1978). For instance, Chunk, Luk, and Lee (1990) and Gillberg and Steffenberg (1987) found that 4-32% of their autistic samples displayed "good" outcome. Even though more recent follow-up studies have suggested better prognosis in children with autism it is

evident that autism continues to be associated with a variable course and prognosis (Gillberg, 1991).

Given that autism is one of the most severe disorders of childhood, it is not surprising that developmental milestones are achieved in a delayed or deviant fashion (Wenar, 1994). As previously reported the acquisition of language before the age of five years appears to be one of the greatest developmental markers and potentially powerful prognostic factors. According to Wenar (1994) delays and deviations exist in milestones related to social behavior and self-concept, perception, attention, higher-order thinking, and language. For instance in the area of social behavior, developmental lags or deviancies existed in the child's imperviousness to the social environment, gaze, display of positive affect, vocalization, imitation, initiative, reciprocity, attachment, play and compliance and negativism. Self-concept, self-recognition and positive affect and coyness were also found to be developmentally delayed or deviant (Wenar, 1994).

Unfortunately the relationship between prognosis and a variety of developmental milestones (apart from age of first word) has been relatively ignored in the empirical literature. Although not specific to autism Favata, Leuzzi, and Curatolo (1987) explored four developmental milestones in a population of children with West syndrome, an epileptic encephalopathy of early infancy as related to intellectual outcome. Sitting unsupported, walking without aid, uttering the first specific word, and using a sentence of two words were explored in relation to prognosis. It was found that the age of motor milestones (i.e. sitting and walking without support) was not predictive of intellectual outcome, but that speech development was significantly

related to outcome. That is the gap between the age of first word and the age at which a two-word sentence was formed increased as IQ decreased. Since epilepsy has been associated with autism it is fair to suppose that the results of Favata et al (1987) could be informative in relation to developmental milestones in a population with autism.

The progression of the disorder is gradual yet there is a high degree of irregularity in the speed of change (Popper & Steingard, 1996). According to Rapin (1997) some individuals with autism improve substantially when they acquire language skills and learn to use these skills to communicate their needs and to influence others. In some cases behavior deteriorates during the adolescent years and may reflect the effects of hormonal changes, depression, or the greater behavioral demands associated with the complex adolescent social world (Gillberg, 1992). Further episodes of overt aggression may occur during periods of environmental stress or recurrent medical illness as well as during periods of rapid development (Popper & Steingard, 1996).

Only a small minority of those with autism progress to the point that they are able to lead productive, self-supporting lives, while the majority remain relatively dependent (Rapin, 1997). According to Spiker, Lotspeich, and Kraemar (1994) social skills rarely improve to the degree that permits successful marriage yet those mildly affected do occasionally marry and have children.

Intervention

Given the severity of the disorder it is not surprising that a wide variety of treatments have been utilized including dietary interventions, megavitamins, educational interventions, sensory integration (Ayres, 1972), auditory integration

therapy (Stehli, 1991), pharmacological treatments (Buitelaar & Willemsen-Swinkels, 2000; Diler, Firat, & Avci, 2002), and behavioral therapy (Lovaas, 1987, 1996; Olley, Robbins, & Morelli-Robbins, 1993).

The need for early intervention programs has been emphasized in the treatment of autism (Dawson & Osterling, 1996). For example, Fenske, Zalenski, Krantz, and McClannahan (1985) compared the progress of nine children who began intensive behavioral treatment before age five with six who entered the intervention program after age five. Both groups were determined to exhibit comparable levels of autistic behavior prior to treatment. It was found that out of the nine children who began treatment before the age of five, six made considerable progress. Only one out of the nine children in the comparison group made comparable gains. Similarly, Lovaas (1987) reported that approximately half of the 19 children who initiated an intensive early intervention program of 40 hours a week before age four (47%) achieved normal intellectual and educational functioning with normal-range IQ scores and successful first grade performance in public schools. Another 40% were mildly retarded and assigned to special classes for the language delayed and 10% were profoundly retarded and assigned to classes for the autistic/retarded. Conversely out of the children from the control group of 40 who received less than 10 hours a week only one child achieved similar gains.

At present the best available evidence directs researchers and practitioners to the importance of appropriate structured educational interventions to foster the acquisition of basic communicative, social, and cognitive skills (Volkmar et al., 1997). Kazdin and Weisz (1998) reported that when examining empirically supported

treatments for children with autism programs such as Lovaas (1987) and Sheinkopf and Siegel (in press), these behaviourally oriented programs appear to be exemplary treatment models. In addition these authors stated that "valuable research can be done outside the confines of a laboratory…constraints of real life may limit how experimentally pristine one may be in research with severe conditions" (p. 17, cited in Kazdin & Weisz, 1998).

Multiple treatment programs exist yet have not been empirically validated, such as the TEACCH program in Chapel Hill, North Carolina (Rogers, 1998). According to Rogers (1998) lack of empirical validation does not mean that treatment is ineffective, instead that efficacy has not been objectively revealed. As well, many challenges exist in conducting double-blind studies to measure the effectiveness of autism treatment programs. To this end much work needs to be done in verifying the efficacy of present treatment programs in order for us to better comprehend what works, what leads to better gains, and what regimens seem ineffective in existing treatment models.

Summary

Autism has been mystifying researchers for over a half a century (Rodler, 2000), identified as the most severe developmental disorder of childhood (Baron-Cohen, 1995; Volkmar, 1997; Wenar, 1994). As outlined by Kanner (1943) symptoms includes the presence of stereotyped and self-stimulatory movements, occasional areas of isolated proficiency or interest, a marked resistance to change, and unusual and often limited development of language. In the more recent literature autism is characterized by impairments in the development of speech and language

skills, cognitive abilities, social skills, as well as by a restricted repertoire of interests and behaviors (Klinger & Dawson, 1996). Autism is presently considered a neurodevelopmental disorder (Alarcon et al., 2002).

The prevalence of autism is approximately 2-5 per 10,000 (Volkmar, 1997) and varying theories exist regarding the etiology of autism. Associated medical and psychological conditions are also known to concurrently exist with the disorder. The course of autism is progressive yet irregular. Measured intelligence (Waterhouse, 1989) and the age of a child's first word (Lord & Paul, 1997) appear to be significant prognostic factors in autism. Treatment for Autistic disorder has produced varying results. According to Dawson (1992) autism remains a puzzling disorder, as wide differences exist in severity and symptomatology.

In the next section the issues of attachment and autism are discussed. More specifically an overview of the current literature pertaining to attachment is examined. Following this the relationship between attachment and autism is presented and a rationale for the current study is provided.

Attachment Theory: An Introduction

Characterized in terms of affective and behavioral regulation, attachment represents an essential normative process in early infant development (Carlson & Sroufe, 1995) and has become a primary organizing theme of early social development (Walters, Barett, & Feinstein, 1990). "Classic attachment theory emphasizes the intrapersonal drive for social relatedness and the interpersonal relationships necessary to satisfy that drive" (Huebner & Thomas, 1995, p. 112). Carlson and Sroufe (1996)

delineated that attachment exemplifies the culmination of all early development in the first year of life and the basis for self-regulation.

An Overview of Attachment Theory

The development of attachment theory began during Bowlby's (1944) observations of two young boys who experienced disruptions in their mother-child relationships (cited in Cassidy, 1999). Based on these observations and investigations of 44 thieves attachment theory is a formulation of personality development which can be characterized as "a way of conceptualizing the propensity of human beings to form strong affectional bonds to particular individuals and of explaining the many forms of personality disturbance and emotional distress" (Bowlby, 1977a, p. 201).

Attachment theory incorporates psychoanalysis, cognitive psychology, control theory and evolutionary biology although Bowlby (1980) deviates somewhat from the psychoanalytic view of attachment as a secondary drive and emphasizes the quality of care as the central issue of infancy (Carlson & Sroufe, 1995). Several key elements of attachment theory can be summarized by Bowlby (1980) as follows: 1) Attachment can be defined as any form of behavior which results in an individual retaining or attaining proximity to another preferred or differentiated individual (caregiver); 2) Attachment behavior is a class of behavior distinct from feeding and sexual behaviors, yet equally significant to these behaviors in human life; 3) Healthy attachment behavior leads to the development of affectional bonds which are initially between parent and child and later on are present and active throughout the life span; 4) Similar to other instinctual behaviors, attachment behavior is mediated by goal-directed behavioral systems. The goal of attachment is to maintain proximity to, and

communication with, the attachment figure; 5) Attachment behavior is only active when required; 6) Many intense emotions arise from the formation, maintenance, disruption, and renewal of attachment; 7) Attachment contributes to the survival of an individual as maintaining proximity to a caregiver reduces the risk of coming to harm; 8) Psychopathology is viewed as an individual's psychological development having deviated from a normal pathway; and 9) Attachment behavior is organized within an individual's personality which impacts the pattern of affectional bonds made throughout the life span.

Attachment undergoes differentiation continuously throughout the life span coordinating and integrating with emerging developmental issues as well as with all domains of the mind such as emotion, cognition, language, and social cognition (Cicchetti, Toth, & Lynch, 1995). The formulation of attachment involves a complex process involving changes in sensory, motor and cognitive functions (Insel, 1997). In addition, through the attachment relationship (i.e. typically a mother/child dyad), "internal working models" of the self, others, and relationships can aid an individual in organizing thoughts, plans, and internal states (Bowlby, 1988a).

Several implications resulted from Bowlby's emphasis on the responsiveness and availability of the attachment figure. "First, when children or adults view their attachment figures as both available and responsive, they feel secure. Second, a child's appraisal of a parent's availability and responsiveness depends not only on the physical presence or absence of the parent, but more importantly on expectations of parental response and the quality of parent-child communication. Third, "closed communication in attachment relationships creates risks for adjustment problems, not

only by increasing the child's anxiety about the parent's vulnerability, but also distorting the expression of attachment-related emotions such as fear, anger, and sadness" (Kobak, 1999, p.25). According to Zeanah (1996) the exploratory system and the attachment system function in tandem within the child to create a balance. The child is motivated to explore if security is felt and if the child becomes frightened, the motivation to discover diminishes as the motivation to seek comfort and proximity increases.

It is widely recognized that a central role in a child's development is the parent-child relationship. However empirical data support for such a hypothesis are recent and remarkably limited (Goldberg, 1991). According to Rogers et al. (1991), research on attachment relationships has been tremendously influenced by Bowlby's (1958, 1969) clinical descriptions and theoretical formulations and Ainsworth's development of a standard model for investigating attachment behaviour (Ainsworth et al., 1978). Further elucidating attachment processes in infancy and on the developmental sequelae of secure and insecure attachment patterns has been the primary focus of attachment researchers (Cicchetti et al., 1995).

The predominant measure utilized to assess the quality of attachment is Ainsworth et al.'s (1978) Strange Situation, which was designed to activate the infant's attachment behaviors. The paradigm involves observing the caregiver (which was usually the mother), the child, and a friendly but unfamiliar adult in a laboratory playroom, as each child experiences a sequence of eight semi-structured episodes (Ainsworth & Wittig, 1969; Ainsworth et al., 1978). According to Goldberg (1991),

> The crux of the procedure is a standard sequence of separations and reunions between the infant and each of the two adults. It is felt that over the course of the eight episodes, the child experiences increasing distress and a greater need for proximity. The extent to which children cope with these needs and the strategies they use to do so are considered to indicate the quality of attachment (p 394).

Ainsworth's original system for classifying children's individual differences in response to the strange situation included three categories of attachment: secure (Type B), insecure-avoidant (Type A), and insecure-ambivalent (Type C) (Capps, Sigman, & Mundy, 1994). An additional category, disorganized-differentiated attachment (Type D) (Main & Solomon 1986; 1990) was added to this list for children who did not fit in any of the aforementioned categories.

A child demonstrating Type B attachment behaviour known as secure attachment views the caregiver as a secure base for exploration. This child is active in seeking contact or interaction upon reunion with the caregiver (Ainsworth et al., 1978). Infants who demonstrate secure attachment behaviour may show signs of distress in the absence of their primary caregiver. However upon the mother's return this child greets the caregiver positively and soon begins to explore once more. In normative age samples, this behaviour pattern is shown by two-thirds of children (van Ijzendoorn, Goldberg, Kroonenberg, & Frenkel, 1992).

A child presenting with insecure-avoidant attachment behaviour can be described as seeking independent exploration. According to Ainsworth et al. (1978), this child demonstrates active avoidance upon reunion with the mother (e.g., turning,

looking, or moving away, ignoring). Van Ijzendoorn et al. (1992) indicate that this pattern is seen in approximately one out of five children in normative samples.

A child presents an insecure-ambivalent attachment style when there appears to be a lack of exploration. According to Ainsworth et al. (1978) such a child may have difficulty separating from the caregiver. She may need contact even prior to separation and is typically wary of novel situations and people. He or she may also have difficulty becoming settled upon reunion with the caregiver. In addition, contact seeking may be mixed with contact resistance such as hitting and kicking (Ainsworth et al., 1978).

The primary characteristic of disorganized-differentiated attachment style, which is thought to be a form of insecure attachment, is characterized by disorganized coping mechanisms displayed in contradictory behavior patterns (Cicchetti, Toth, & Lynch, 1995). Children demonstrating this behaviour pattern appear apprehensive toward their caregiver. Such behaviour is observed to be undirected and involve incomplete movements and expressions, stereotypies, asymmetrical movements, and anomalous postures. Freezing, stilling, and dazing behaviours are also observed (Main & Solomon, 1990) (see Appendix B).

Others argue that the tenets of the Strange Situation paradigm are only partly empirically supported in the attachment literature, and that caution in the interpretation of the results of this paradigm are warranted (Lamb, Thompson, Gardner, Charnov, and Estes, 1984). As a result Lamb et al. (1984) developed an alternative model to assess attachment on a continuum by rating the variables of proximity and contact seeking, contact maintenance, contact resistance and proximity avoidance on a Likert

scale. It appears that the use of such a continuum was thought to better account for atypicalities and individual differences (Rogers et al., 1991) in the demonstration of attachment behaviour. Sagi & Lewkowicz (1987) reported that a similar psychological experience for all infants may not be created in the Strange Situation.

Siblings and maternal attachment. Attachment theory allows for discordant attachments across a caregiver's children, particularly in light of changes in maternal behaviour (Berlin & Cassidy, 1999). Maternal sensitivity appears to be one of the most common antecedents examined in the prediction of attachment to a primary caregiver (typically the mother) (Braungart-Ricker, Courtney, & Garwood, 1999), as an appropriate and contingent response produces a sense of control in the infant and facilitates secure attachment (Maccoby, 1980). Instability of maternal behaviour over time also influences the development of parent-child attachment and may result in disconcordance of attachment amongst siblings (Ward et al., 1988). Child characteristics such as temperament, for instance, play an important role in affecting the dyadic relationship, as the qualities of the child complexly interact with the parent's own characteristics (Rosen & Rothbaum, 1993; Waters, Vaughn, Posada, & Kondo-Ikemura, 1995). Additionally, Rosen and Burke's (1999) study which examined multiple attachment relationships within families (i.e. one mother, one father, and two children) revealed that mothers and fathers do not necessarily develop the same attachment patterns to their children. The pattern that one parent developed with one child was found to be independent of the quality of the parent's relationship with the other child (Rosen & Burke, 1999). More specifically, despite consistency towards their two children in relation to caregiving behaviours, parents were equally

likely to be congruent or incongruent in their attachment relationships (Rosen & Burke, 1999), as transmission of attachment patterns in siblings, in many instances, does not take place (Sagi et al., 1995)

There have been few attempts to test the hypotheses surrounding heritability of attachment behaviours and quality of attachment classification. Finkel et al (1997) suggested that greater concordance for attachment classification was demonstrated in mono- versus dizygotic twins (cited in Berlin & Cassidy, 1999), while Vaughn and Robb (1988) reported that nontwin siblings displayed moderate concordance rates (61-64%) for attachment security. In 1995, Sagi et al. found that unrelated children who were cared for in the same kibbutz demonstrated concordance rates of 68-70%. Taken together however, the small sample sizes in these research studies limits the interpretation of the findings related to attachment behaviour and security within siblings.

Attachment and Developmental Psychopathology

Developmental psychopathology is concerned with the study of clinical impairment (Kazdin, 1989) focusing on defining, mapping and understanding normative pathways of child development, specifying deviations from these pathways, outlining behaviors that occur as individuals follow atypical courses of development and revealing factors that return individuals to any particular pathway (Sroufe, 1989). In relation to attachment theory research has yielded an abundant and rapidly growing pool of data on the importance of early caregiving experiences in the promotion of adaptation and in the development of psychopathology (Jones, 1996). Bowlby was convinced that major disruptions in the mother-child relationship were precursors of

psychopathology later on in the life span (Cassidy, 1999). Attachment theory has also been of particular interest to psychologists concerned with developmental psychopathology. Research in attachment offers a quantitative means through the study of language and nonverbal behavior to validate hypotheses on the importance of the parent-child relationship in the etiology of disorders, the development of personality, and cross-generational transmission of risk (Jones, 1996). Jones (1996) argued that "the view of development as relationship based, and the observation that the internalization of relationship experience is the product of interactions with parental caretakers, have important implications for clinical theory and research" (p 5). Thus the concept of development is integral to both the theory of attachment and the domain of developmental psychopathology (Carlson & Sroufe, 1995).

Two approaches can be viewed in attempts to link attachment and psychopathology. The consideration of deviations in attachment is one approach, which can be reflected in DSM-IV (APA, 1994) and ICD-10 (World Health Organization, 1992) classification of two types of attachment disorders of childhood (Carlson & Sroufe, 1995). A second approach to this link of psychopathology and attachment is to consider disturbed attachment relationships as markers for risk or development of later psychopathology (Cicchetti, Toth, & Lynch, 1995).

Attachment and Autism

Originally it was assumed that children with autism did not form attachments to their primary caregivers (Klinger & Dawson, 1996). For instance Cohen, Paul, and Volkmar (1986) demonstrated that children with autism were not able to discriminate between familiar and unfamiliar adults. Further Dawson (1989) suggested that

differential proximity seeking (which is thought to be crucial in the expression of attachment) should be viewed only as a primitive element of attachment (Dawson, 1989) as proximity to a parent may also be partly due to a familiar and predictable social interaction, resulting in considerably more simplistic attachment patterns than accounted for by traditional classification of attachment behaviors.

According to Gartner and Schultz (1990) "many severely withdrawn autistic young children, especially those whose symptoms appear early, do not elicit normally emerging mothering responses" (p. 159). Research conducted by Robson and Moss (1970) revealed three different behavioural classifications of infants later diagnosed with autism. These were either 1) extremely demanding, 2) quiet, or "good" babies who stayed in their crib and communicated few cues to their mothers, or 3) infants who were fussy, irritable, and not easily comforted. Limited eye contact was displayed by these three groups and children were observed to not always be aware of their mother's presence. Robson and Moss (1970) also found that children with autism rarely smiled or initiated contact with their caregivers. The findings of this study correspond with Rutter's (1978) belief that, in this child population, reciprocity of social interchange is missing.

Nonetheless other researchers have found that children with autism do show differential responses to primary caregivers (Dissanayake & Crossley, 1997; Shapiro, Sherman, Calamari, & Koch, 1987; Sigman & Mundy, 1989; Sigman & Ungerer, 1984a). For example Sigman and Mundy (1989) found that children with autism and those with mental retardation behaved in a similar fashion when separated from, and reunited with, their primary caregivers. That is both groups directed more social

behaviors to their caregivers than to strangers and increased their preferential behavior after separation. Sigman and Mundy (1989) suggested that children with autism are able to form attachments, but have significant difficulties understanding and responding to social information.

Researchers have also examined the quality of the attachments formed by children with Autistic Disorder. In recent years, the quality of attachment relationships has been measured through the utilization of the Strange Situation (Ainsworth et al., 1978) as previously described. This classification system attempts to incorporate not only normative samples of children and their dyadic attachment relationships but also provides a pattern of attachment, which has been identified in more clinical populations (i.e. Type D) (Main & Solomon, 1990). Capps, Sigman, and Mundy (1994) demonstrated that disoriented and disorganized behaviors were displayed by their sample of children with autism if the autistic behaviors are ignored. Other researchers who utilized both the Strange Situation paradigm and Lamb et al. (1984) rating system have demonstrated that children with Autistic Disorder display attachment styles similar to a normative age-matched population (Rogers et al., 1993), with 50% of children being classified as having secure attachment.

Even so various methodological issues complicate the interpretation of such empirical findings. For instance the comparison groups utilized did not display the multiple impairments in social, cognitive, language and behavioral development consistent with autism (Capps et al., 1994). Even psychiatric control groups fail to demonstrate the range of deficits displayed by this clinical population. Therefore the uniqueness of this developmental disorder makes comparisons to other groups

challenging. Although noteworthy in the attempts of past research to rigorously measure attachment by controlling for specific developmental variables such as chronological age, IQ, language abilities, socialization, and presentation severity, difficulties remain in the exploration of attachment in comparison to a typical and/or developmentally delayed sample. That is even if such contrasting samples are comprised of children with multiple developmental delays and challenges, the impairments shown by children with Autistic Disorder present with a distinctiveness which seems unlikely to be controlled for. In the case where children with pervasive developmental disorders were compared to one another, and attachment is also rated on a continuum by utilizing Lamb et al. (1984) rating system (Rogers et al, 1993), the existing attachment literature does not seem to address or incorporate the present oddities inherent in Autistic Disorder in the classification of attachment quality.

Rationale for the Present Study

Throughout the past century researchers have been establishing a multitude of theories surrounding child development. To name a few, Sigmund Freud, Erik Erickson, Lawrence Kolhberg, and Jean Piaget developed theories which describe development in a series of stages. Here developmental events are outlined in age-defined terms. Although agreement appears to exist that development is generally an ongoing process, stage theorists argue that changes occur in a predictable sequence of events (LeFrancois, 1997). However, stage theorists do not claim that a twelve-year-old girl, for example, is a prepuberal child one week and an adolescent the next, but rather that the child's structure and behaviour warrant the label of a new stage of development (Thomas, 1992). In relation to infancy and early childhood, the literature

supports differentiating children age birth to three-years-old from those that are four years of age and up. Such a differentiation is relevant to the present study.

From a developmental standpoint, stage theorists outline shifts that occur during this particular time frame. Drawing on Piagetian theory pertaining to cognitive development, two-and-three-year-old children are theorized to be moving from a stage where they continue to develop symbolic activities and language (known as preconceptual), to a stage where they (at approximately age four) begin to separate mental from physical reality and understand multiple points of view (known as transitional) (Craig & Kermis, 1995). Changes in communication occur as a three-year-old child progresses from having an increased vocabulary (average is approximately 1000 words) and a more advanced use of grammar (e.g., Where is Daddy) to the use of more complex structural distinctions from age four (e.g., He promised to help her) (LeFrancois, 1997). Motor development also becomes more coordinated between the ages of two to three to age four, as four-year-old children appear to have greater endurance, strength, and coordination (Craig & Kermis, 1995). In terms of socialization, when we examine Erik Erickson's stages of psychosocial development, children ages two to three are reported to be in a stage where they are assessing whether or not they can do things for themselves (autonomy versus shame and doubt); four-year-old children have moved to the next stage which focuses on independence from parents and the ability to explore limits (initiative versus guilt) (Thomas, 1992). Additionally four and five year old children seem to have developed indirect methods of showing their need for others such as asking questions, showing off, offering to help, or even being disobedient, rather than crying for attention or

seeking close physical proximity (Craig & Kermis, 1995). Taken together significant changes occur across cognitive, communication, motor, and social domains between these age groups.

Attachment processes also shift and change from infancy to early childhood. As previously stated, attachment behaviour is characterized as a child's use of a caregiver from which to explore. Marvin and Britner (1999) outlined that as a child moves into the post-infancy preschool period, she will take greater responsibility in self-protection and in the integration of social behaviour. Changes across developmental domains (e.g., socialization and communication) will occur simultaneously (Marvin & Britner, 1999). The presentation of attachment behaviour shifts as a child gets older, and an infant's demonstration of secure base behaviour is seemingly different than a four-year-old child. As children continue to develop, resiliency in the face of conflict and ways in which to manage feelings and impulses emerges (Levy & Orlan, 1998). For instance a typically developing toddler establishes a sense of autonomy, independence, and self control during the course of his or her development (Marvin & Britner, 1999). Such changes would then shift the overt use of the caregiver as a secure base in that the amount and nature of proximity and contact needed would likely be modified as a result of the child's new found independence and emergent sense of self.

Factors affecting secure base behaviour. A number of factors appear to affect the typically developing child's demonstrations of attachment behavior. These factors are critical in the relational demonstration of a child's ability to utilize a secure base from which to venture forth. To begin gaze is a social behaviour that looks to engage

and promote social interaction. In infancy, between the ages of nine and eleven weeks, most of an infant's visual attention is drawn to the eyes of others, particularly the caregiver (Simpson, 1999). Eye gaze acts as a signal to the adult, and, once the signal is responded to, "the baby, in effect encourages the adult to remain close to him by continuing to emit those behaviours that serve to rope the adult in" (Craig & Kermis, 1995, p. 264). Basic behaviours such as sucking, grasping, crying, and smiling are also said to be innate modalities of attachment to the mother (Brazelton & Cramer, 1991).

According to Levy and Orlans (1998) the use of touch, displays of eye contact, the ability to overtly demonstrate attention and positive interaction through the use of a smile all affect the attachment relationship and a child's consequent use of a secure base. The gratification of basic needs and the responsiveness to such needs (Craig & Kermis, 1995) also assists in alleviating a child's discomfort and arousal (Levy & Orlans, 1998). The importance of affective factors have also been demonstrated as important to the quality of the attachment relationship, including such elements as the mother's sensitivity to her infant's affective cues, expression of positive affect, along with a provision for a secure base (Demos, 1982). It is presumed that both the infant and the mother's behaviour reflect the structure and organization of their relationship (Pederson & Moran, 1996). According to Hamilton (2000), disruption in the parent-child relationship as a result of separation or familial stress may also affect the attachment. As well a child's ability to express his or her needs in a verbal fashion and/or nonverbally communicate to a caregiver in an interactive and reciprocal fashion also seems to have an effect on behaviour which impacts environmental exploration.

Pointing for instance is used in a spontaneous interchange and is considered a communicative behaviour (Lord et al., 1994). When children are limited in their use of communication they likely will develop other means to initiate social responsiveness. Social communication appears to be an integral part of typical child development and seems logically related to the parent-child relationship.

Factors and autism. Behavioural change occurs rapidly during the early developmental years in typically developing and children with autism (Lord et al., 1993). Developmental deviations inherent in Autistic Disorder may disrupt the course and use of attachment behaviours. As previously discussed in the social and language abnormalities section of this chapter, atypicalities in these areas are complexly intertwined and developmentally deviant in their presentation (Hobson, 1989; Fein, Pennington, & Waterhouse, 1987; Volkmar, 1996, 1987). More specifically impairments in eye gaze, joint attention, and the desire to attract other's attention (Sigman, 1989) along with delays in the use of empathy, joint attention and imitation (Charman et al., 1997) describe the impairments in the child's ability to produce and understand emotional expression. In contrast to typically developing infants, children with autism appear to view the world of emotions as foreign (Walters, Barrett, & Feinstein, 1990). Sigman and Mundy (1987) also indicated that positive affect (e.g. happiness, joy) is not displayed as frequently in this population. Dawson (1990) suggested that children with autism are less likely to combine smiling with eye contact, and are unlikely to smile in response to a mothers' smile. The use of oral language and/or conventional methods of nonverbal communication (e.g. gestures)

also present as delayed and/or deviant (Dawson, 1992), as children with autism differ in the quality and rate of their language development (Rutter, 1967).

Next in examination of the nature of attachment behaviour, proximity seeking and contact with the primary caregiver serves multiple functioning within the context of the primary caregiver relationship and in the socio-emotional development of the child. If we recall, healthy attachment behavior leads to the development of affectional bonds and many intense emotions arise from the formation, maintenance, disruption, and renewal of attachment. It seems logical that when critical developmental processes such as these have gone awry, the quality of the attachment relationship would be affected. Further the expression of this relationship through behavioural means may also be compromised, as typical demonstrations of secure base behaviour could be affected by the abnormalities inherent in Autistic Disorder. According to Kobayashi (2000), affective breakdown resulting from abnormal hypersensitivity to stimuli and a tendency to evade personal interaction disrupt the parent-child relationship.

In examination of Weinfield, Sroufe, Egeland, and Carlson (1999) it appears that arguments are put forward for individual differences in attachment. These authors discuss that such differences are broadly categorized in terms of secure and insecure attachment quality. Sroufe (1997) also provides a developmental model to examine attachment stating that individual differences are viewed in relation to distinctive developmental trajectories. According to Carlson and Sroufe (1995) the concept of development is integral to both the theory of attachment and the domain of developmental psychopathology. In relation to autism Wenar (1994) outlined the

deviances associated with the developmental pathways of affected children. As a result of such deviancies a range of qualitative behaviours in the attachment relationship (which are critical and essential developmental constructs) may also be presented. Sigman and Mundy (1989) reported that children with autism are able to form attachments, but have significant challenges comprehending and responding to social information.

Depending on the developmental level of the child with autism and the resulting shifts and changes in demonstration of attachment behaviour, oddities are likely part of the exhibition of secure base behaviour. This may occur, particularly since a child with autism's development of self-protection, identity, independence and autonomy are challenged. Behavioural oddities such as perseverations, resistance to change, compulsions/rituals, along with unusual preoccupations may add an additional layer, which is uniquely interwoven in the presentation of the aforementioned attachment behaviours. As these behaviours evolve and become more pronounced in the child's repertoire of social functioning, demonstrations of a secure base may present in an enigmatic manner. Finally, Boelte and Poustka (2000) reported that symptoms of autism appear to be the most severely presented between the ages of four and five.

Current Study

Given the social and communication deficits, odd and unusual behavioural presentations, etiological variability, and a wide presentation of symptom severity in children with autism, along with the limited research conducted in the area of attachment behaviour in this clinical population, differences in parent-child

relationships were examined. Although past research (which utilized small sample sizes) has examined attachment behaviour in children with autism, many issues seem to complicate the interpretation of the findings in light of the existing attachment literature.

Past research examining attachment in children with autism has found that developmental level appears to be related to attachment security (Rogers et al., 1991). Others have postulated that behaviour associated with autism may have no counterpart in the behaviour of typically developing children and that the developmental sequelae of behavior does not follow that described for typically- developing children (Wenar, 1994). According to Wenar (1994) this may result in qualitative differences emerging in the attachment behaviours presented in infancy and toddlerhood. Rogers et al. (1993) outlined that differences in the way in which the child with autism views his or her mother and develops an inner working model of the caregiver may be unique and not resemble that of typically developing children.

Thus the complexly deviant development inherent in Autistic disorder and the range in presentation of the disorder indicates the possibility of differences between the presentation of attachment behaviour within an infant/toddler clinical population.

Further it is probable that differences across groups with regard to specific factors (e.g., eye gaze) related to secure base behaviour may emerge. Therefore this exploratory study systematically investigates the demonstration of secure base behaviours in the relationship between children and their primary caregivers, along with factors which affect such behaviour. A secure base can be defined as the child's use of the caregiver as a base from which he or she can explore. Mothers were the

identified caregivers in this study as they are deemed to be particularly critical sources of information in the assessment of pervasive developmental disorders (Lord et al., 1993). The principal tool used in the present study, The Autism Diagnostic Interview-Revised (Le Couteur et al., 1994), was designed to be utilized with a child's primary caregiver (Lord et al., 1993).

Research questions. The primary research question compared two groups of children: 1) younger children (ages 24 months to 47 months) and 2) older children (ages 48 months to 59 months). Potential differences emerging between these two groups and their use of a secure base were explored.

1. In comparing the younger and older groups of children, it was predicted that significant differences exist in their use of a secure base.

Secondary research questions were also designed to examine relationships between: 1) communication, 2) social milestones and 3) interests/behaviour and a child's use of a secure base.

2. In each group, it was predicted that the communication skills of a) social vocalization, b) reciprocal conversation, c) spontaneous talk expressing interest in others, d) communicative speech, e) and spontaneous pointing were significantly related to a child's use of a secure base.

3. In each group, it was predicted that the social milestones of: a) direct gaze, b) social smiling, c) greeting d) showing and directing attention, e) separation anxiety, and f) sharing other's pleasure and excitement were significantly related to a child's use of a secure base.

4. In each group, it was predicted that the interests and behaviours: a) unusual preoccupations, b) difficulties with minor changes in subjects own routines or personal environment, c) compulsions and rituals, and d) unusual attachment to objects were significantly related to a child's use of a secure base.

Chapter Three

Method

Sample

One hundred and eight children took part in this study. The age of participants at the time of the intake assessment of the Autism Genetic Resource Exchange (AGRE) research team ranged from 24 months to 59 months. Seventy-six percent were male and 24% were female. Selection of participants was not random. Participants had to have been formally diagnosed with a pervasive developmental disorder (PDD), specifically Autistic Disorder (see DSM-IV criteria, Appendix A) by a Licensed Psychologist, Psychiatrist, or a Pediatrician using DSM-IV criteria. Only children who have a diagnosis of Autistic Disorder were utilized in the present study.

Description of Participating Agency

Shestack and Iversen started an organization previously called Cure Autism Now (CAN), which collects and shares its own DNA samples, along with lobbying for more resources for autism research. With additional support, the Autism Genetic Resources Exchange (AGRE) was created to assist in enrolling families for research purposes (Marshall, 1997).

"AGRE is a DNA repository and family registry, housing a database of genotypic and phenotypic information available to the entire scientific community. In the second edition of the AGRE catalog, there are a total of 225 families currently available for study, 197 of which are multiplex and 144 of these who have not been part of any other genetic study, to the best of our knowledge. The goal of AGRE is to facilitate more rapid progress in identification of the genetic causes of autism and

autism spectrum disorders by promoting sharing and collaboration. This collection of a large set of multiplex families is a first step in that direction" (AGRE, 2002).

The Autism Diagnostic Interview-Revised

All data were extracted from existing client files in the AGRE database. Information was gathered from the Autism Diagnostic Interview- Revised (ADI-R). The following description of the ADI-R was taken from the AGRE website (AGRE, 2002).

The Autism Diagnostic Interview-Revised (ADI-R) is a clinical diagnostic instrument for assessing Autistic Disorder in both adults and children. The instrument concentrates on behavior in three key areas of qualities of reciprocal social interaction, language and communication, and restricted and repetitive stereotyped behaviors and interests. The ADI-R is a modified and abbreviated version of the Autism Diagnostic Interview (ADI). The intent of the ADI-R was to improve on the original ADI in its ability to differentiate disorders such as Rett syndrome, fragile X, and disintegrative disorders from autism, especially in very young children, along with differentiating between delay and deviance.

The ADI-R is appropriate for use with people who exhibit mental ages beginning at approximately 18 months and above. The ADI-R is a semi-structured, clinical interview for caregivers of adults and children. The interview contains 111 items and centers on behaviors in the three domains. The measure also contains other items relevant for treatment planning, such as over activity and self-injury. Questions are structured around content domains, and definitions of behavioral items are provided. For instance in the area of communication, "Delay or total lack of language

not compensated by gesture" is additionally broken down into specific behavioral items of conventional gestures, nodding head, pointing to express interest, and head shaking. With the exception of a few behaviors that can only be expected to occur during specific age periods, all questions inquire about current behavior. In these cases, specific age restrictions are stated. Such restrictions were set forth in the development of this assessment tool. For example items inquiring about imaginative play and group play are only coded for behavior exhibited between the ages of four and ten years. Questions about reciprocal friendships and circumscribed interests are only scored for children ages 10 and above.

For each section of the interview there is an initial compulsory probe. The investigator is instructed to ask further questions until he or she is able to make the coding for that section. A number of supplementary probes are also included and the interviewer may choose whether or not she wishes to utilize these probes or any other questions in order to clarify aspects of the behaviour being assessed. The interview begins with an introductory question followed by nine questions pertaining to the child's early development. Items following cover verbal and nonverbal communication, social development, play and interests/behaviors. The final 26 questions ask about "general behavior," including motor and memory skills, fainting and overactivity. The interview generates scores in each of the three content areas (i.e., social interaction, communication and language, and restricted, repetitive behaviors). Specific questions are utilized in a diagnostic algorithm to determine if the child meets criteria for a diagnosis of autism.

Substantial training in administration and scoring is required for this

interviewer-based instrument. It takes approximately 90 minutes for a highly trained clinician to administer the ADI-R to the parent of a child suspected of having autism. The interview may take longer when given to parents of older children or adults. Training workshops are annually available in North America and the United Kingdom and training videotapes that outline the organization and purpose of the ADI-R, along with providing detailed illustrations of administration and scoring are available.

Psychometric Characteristics. The ADI-R is a valid and reliable assessment measure. In a study of 51 autistic and 43 nonafflicted mentally handicapped preschoolers, weighted kappas for interrrater reliability ranged from .62 to .96. Test-retest reliabilities, using intraclass correlations, were above .90 in all domains and subdomains (Poutska, Lisch, Ruhl, Sacher, et al., 1996). The ADI-R was also found to discriminate between groups of children with autism and mentally handicapped/language impaired children without autism (Lord, Rutter, Storochuk, & Pickles, 1993). In this study internal consistency reliabilities, as measured by Cronbach's Alpha, were .69 for the restricted, repetitive behaviors domain , .84 for the communication domain, and .95 for reciprocal social interaction.

Most recently Hill, Boelte, Petrova, Beltcheva et al. (2001) found that the interrater and retest reliability were consistently convincing. In another study the ADI-R had decent specificity for detecting autism at 20 months of age and the stability of diagnosis from 20 months to 42 months was well demonstrated (Cox, Klein, Charman, Baird et al., 1999). Challenges in making differential diagnosis between PDD and Asperger disorder were also reported in Cox et al.'s (1999) research article.

Specific reliability coefficients of the variables utilized in the present study are described in the following section which discusses dependent variables.

Use of the ADI-R. In this study the ADI-R provided the researcher with information related to secure base behaviour, social milestones, communication, and interests/behaviours. The ADI-R also provided a differential diagnosis. Only children with a diagnosis of Autistic Disorder as confirmed by the ADI-R were included and information from the ADI-R was obtained in order to examine the hypotheses. Mothers completed the ADI-R in this study.

Interviews were completed between 1996-2001 and conducted by formally trained AGRE research employees. AGRE research employees have obtained post-secondary degrees (PhD, MA, or BSc) primarily in psychology. AGRE raters of the ADI-R were trained by qualified ADI-R trainers and determined reliable by doing several ADI-R protocols on affected and nonaffected children. Point -by-point agreement of their scores and the trainer's scores needed to be at least 90% to be deemed reliable AGRE raters.

Specific ADI-R variables were selected based on past research in the area of attachment and factors which seem to be attachment-related. That is, in drawing out communication, socialization, and interest/behaviour variables from the ADI-R, questions were selected which examined factors related to attachment behaviour. Given the number of subjects utilized in the present study, particular items were selected and chosen over other items which may have also been appropriate. For example, the use of a certain communication variable such as reciprocal conversation

was utilized instead of other communication variables in order to examine communicative intent, rather than overall communicative ability.

Independent Variables

Two groups of children were utilized in the present study: 1) 51 younger children between the ages of 24 months to 47 months and 2) 57 older children between the ages of 48 months to 59 months. Caregivers of younger children reported behaviors that were occurring presently ('Does ____ do this?"), while caregivers of older children provided responses to such statements as "When ____ was 4 or 5, did child do this?"

Social milestones, communication and interests/behaviours were also measured in relation to secure base behavior. Weighted kappas for the interrrater reliability of each of the ADI-R items used in the present study and those which are part of the ADI-R algorithm are included in Table 1. The ADI-R items assessing greeting behaviour, separation anxiety, spontaneous talk expressing interest in others, communicative speech, difficulties with change with routine or in the personal environment, and unusual attachments to objects are not included in the ADI-R algorithm.

Dependent Variable

This study measured the secure base behaviour of children between the ages of two and three (the younger group) and four-year-old children (the older group) (see Table 2). Two aspects of the child's behaviour were important: 1) the child's awareness of the caregiver's location and attention to it, as evidenced by seeking proximity and checking back, and 2) the child's ability to then go on to interact or

Table 1

Specific ADI-R Variables Categorized by Content Domain and Interrater Reliability

Domain and Variable	#	Kw	r
Social Milestones			
Direct Gaze[a]	42	.70	.91
Social Smiling[a]	43	.64	.90
Greeting	44	.81	.92
Showing/Directing Attention[a]	45	.70	.91
Separation Anxiety	60	.78	.90
Sharing Pleasure/Excitement[a]	48	.80	.93
Communication			
Social Vocalizations[a]	16	.77	.93
Reciprocal Conversations[a]	20	.84	.93
Talk Expressing Interest in Others	21	.72	.87
Communicative Speech	28	.89	.94
Pointing to Express Interest[a]	30	.80	.92
Interests/Behaviours			
Unusual Preoccupations[a]	71	.64	.90
Difficulties with Minor Changes	73	.77	.91
Compulsions and Rituals[a]	75	.63	.90
Unusual Attachment to Objects	76	.64	.90

Note. Drawn from ADI-R protocol description (Lord, Rutter, Le Couteur, 1994). [a] *Items used in the ADI-R diagnostic algorithm. Kw=Weighted Kappas. r=Intraclass correlations.*

Table 2

Description and Coding of the Specific ADI-R Secure Base Dependent Variable in the Domain of Socialization

Under 4 Years Old	**"When_____is playing, does he or she ever 'check back' to see where you are when he or she is playing in another room-as if to make sure that everything is alright? What about if you're together in a park or playground?** Does he or she ever come back to you from time to time to make sure he or she knows where you are? Do you ever worry about his or her wandering off? How does he or she react if a stranger comes right up and tries to talk to him/her?
Over 4 Years Old	**"When_____was 4 to 5 years old, did he or she tend to 'check back' to see where you were when he or she was playing in another room-as if to make sure that everything is alright? What about if you were together in a park or playground?** Does he or she ever come back to you from time to time to make sure he or she knew where you were? Did you ever worry about his or her wandering off? Did he or she ever 'check back' when younger than 4?
Bolded text	= Compulsory Probe
Regular text	= Secondary Probe

Codes

0 = uses parent(s)/caregiver as a secure base, indicated by seeking proximity when approached by stranger and checking in when in a new situation, but, once settled, being able to interact or explore.
1 = occasionally uses parent(s)/caregiver as a secure base, but with less frequency, spontaneity or more narrow range of contexts than '0'.
2 = seek parent(s)/caregiver primarily to avoid other social contact or out of fear; no use of parental/caregiver's proximity to explore or interact.
3 = no seeking of parent(s)/caregiver in new situations
7 = excessively clingy across a variety of situations
8 = N/A
9 = Not known or not asked

Note. Drawn from ADI-R protocol description (Lord, Rutter, Le Couteur, 1994)

explore a new situation. Weighted kappa for the interrrater reliability of this item was .81 (Lord et al., 1994) with an intraclass correlation of .97. The secure base item, along with other items utilized in this study is not included in the ADI-R diagnostic algorithm.

Scores were based on the clinician's judgment following the caregiver's report of the child's development and behaviour. Most scores ranged from '0' to '3.' A child received a score of '0' when behavior of the type specified was probably present or not present (e.g. no circumscribed interests of an unusual degree). A score of '1' was made when it was clear that the subject had exhibited behaviour of the type specified in the coding, but where it was not frequent, severe, or marked enough to warrant a '2' rating. A rating of '1' was not used to reflect dubious, vague, or uncertain abnormalities, such ratings are scored as '0'. A score of '2' indicated "definite abnormal behavior" and a score of '3' referred to "extreme severity" of the specified behavior. When a behaviour was nonapplicable (as in the example of a nonverbal child), '8' was coded. Overall there were three circumstances when a coding was nonapplicable: 1) the child's age fell outside the range used for coding (e.g., a three year-old could not be coded on items that required a child to be four and older), 2) the child did not have the behaviour specified in the coding (e.g., a nonverbal child for the communication abnormality codings), and 3) the child had never been in the circumstances required to exhibit such behaviour (e.g., an extremely isolated child, who had not been exposed to other children, received a behaviour coding of '8'). When it is unknown whether a behaviour had occurred, a '9' was rated. In few instances, a coding of '7' was permissible to record that a definite abnormality, which

was not of the type specified, but in the general area of coding, was present. For instance it was not unusual for children who were mentally challenged to show some abnormalities of the types associated with PDD, even though it was less common for these children to demonstrate these difficulties over a range, pattern, and severity sufficient to meet full diagnostic criteria of PDD. Therefore the concern regarding the avoidance of 'halo' effects led to such restrictions on '7' codings (see Table 3). Scores of 4, 5, and 6 were not offered in these sections of the ADI-R. To be given a diagnosis of Autistic Disorder a child must have met criteria in each of the three content domains and exhibited some abnormality in at least one content domain by 36 months of age (see Appendix A for specific diagnostic criteria as put forth by the DSM-IV). The cutoff total score for the communication and communication content domain was 8 for verbal subjects and 7 for nonverbal subjects. For all subjects, the cutoff for the restricted and repetitive behaviors was 3, while the social interaction content domain was 10. Therefore a total score of 21 (verbal) and 20 (nonverbal) is needed to meet the DSM-IV diagnostic criteria for Autistic Disorder.

Early Developmental Coding

The actual age of attainment of the milestone was reported if the parents recalled it. Other coding of early developmental milestones utilized a coding system with codes in the 990s. That is codes ranged from 991-999. For a description of such variables, please see Table 4. Depending on the milestone the indication of when the milestone is reached varies. For instance for bowel control, a child had to have been continent for 12 months, while for walking unaided, before or at 17 months of age is considered attained.

Table 3

Summary of ADI-R Coding for Behavior

Score	Description
0:	Behaviour of type specified in the coding is/was present (or not present)
1:	Behavior of type specified is/was present in abnormal form (or 'lack of behaviour' was present), but not sufficiently severe, frequent or marked to meet criteria for '2'
2:	Definite abnormality of the type specified that meets/met the criteria given for that coding
3:	A more severe manifestation of '2'
7:	Definite abnormality in the general area of the coding, but not of the type specified
8:	Not applicable (no opportunity to exhibit the behavior because outside relevant age range, does not have the required level of behaviour, or because never in circumstances that could elicit the behavior)
9:	Not known

Note. Drawn from ADI-R protocol description (Lord, Rutter, Le Couteur, 1994)

Table 4

Summary of Early Development ADI-R Coding

Score	Description
991:	Parent reporting no concern
992:	Parent having been worried since birth
993:	Milestone attained yet child has relapsed
994:	Having never achieved the milestone
995:	Milestone still not reached, such as a child being continent, but for a period of less than 12 months
996	Unknown, but apparently normal
997	Unknown, but apparently delayed
998	Unapplicable
999	Not known or not asked.

Note. Drawn from ADI-R protocol description (Lord, Rutter, Le Couteur, 1994)

Consent and Confidentiality

Consent was not needed directly from parents in this study. Parents were asked to read and complete a six page AGRE document, which outlined consent. The purpose of gathering information was fully explained in the purpose section of the Consent to Participate in Research form (see Appendix C). Although the research purpose was explained in reference to genetic research, "other data collected in this study is available to scientists who want to do research on autism and related disorders" (see page 1 of Appendix C). Further as a researcher, the necessary paperwork was completed and reviewed by the AGRE steering committee in order for access to be obtained. The researcher's application was then approved and full access to the information gathered by AGRE was authorized. Approval to conduct research was also granted by The University of Alberta, Ethics Review Committee. Participants had the right to withdraw from the AGRE study at any time without giving any reason. For a complete explanation of the withdrawal procedure, please see the Withdrawal from the Research Project section of the Consent to Participate in Research form (see Appendix C).

Children's names were numbered and coded during the course of data collection in order to maintain anonymity. Information was not shared with anyone outside the AGRE research team. All information files were kept strictly secured (see Appendix C). Upon requesting access to the database, confidentiality was included in the access form and researchers signed this form before they were able to use the AGRE data.

Procedure

The present study began with an exploration of socio-emotional information in relation to attachment. A survey of the existing empirical literature related to social behaviour and attachment in autism was conducted. Once this exploration was completed permission to obtain access to the AGRE database was commenced. After permission was granted an examination of the data available at AGRE took place. Data were gathered by extracting information from the AGRE database. With the use of an access password, data were downloaded from the AGRE website. All data was double entered and entries were compared for accuracy. Multiple contacts with members of the steering committee took place and additional details regarding the organization of the AGRE database were provided at this time. Finally, once all of the data were downloaded, information was coded onto a data file. With the assistance of the AGRE staff, the database was organized in a manner which facilitated the examination of the researcher's exploratory hypotheses.

Data Analyses

As previously described, items were scored from 0-9 in the ADI-R. Scores of 7 were pooled with 0 codings (Fombonne, 1992; Le Couteur et al., 1989; Lord et al., 1993). Items where AGRE raters scored "not known" because of inadequate information were excluded from data analyses (Le Couteur et al., 1989). When codings of 8 were reported, given that this coding could be interpreted in three different ways (i.e. no opportunity to exhibit the behavior because outside relevant age range, does not have the required level of behaviour, or because never in

circumstances that could elicit the behavior), these scores were also excluded from statistical analyses in the present study.

Analyses were conducted using SPSS 10.0 for Windows. Descriptive statistics and correlational analyses were performed to offer a better understanding of the characteristics of the current sample and to provide additional support for the inferential statistics conducted. A one-way analysis of variance (ANOVA) was conducted to compare the 2 groups of children: 1) younger children (ages 24 months to 47 months) and 2) older children (ages 48 months to 59 months).

Regression analyses were also utilized to investigate significant relatedness between each group's use of a secure base (see definition in Table 1) and variables in the domains of communication, socialization, and interests/behaviour. Univariate analyses were conducted on each independent variable in all three domains to determine which developmental variables offered predictive power in relation to demonstrations of a secure base. In the areas of communication and socialization, step-wise regression analyses were chosen (Nelder & Wedderburn, 1972). Step-wise regression has been utilized by other researchers using the ADI-R (Lord & Pickles, 1995) to examine predictive relationships within ADI-R communication scores and socialization items. Researchers have also utilized step-wise regression as a useful tool in developmental studies assessing children with Mental Retardation (Bihm et al., 1992) and neurodevelopmental disorders (Ottenbacher et al., 2000) including studies examining predictive factors in young children with autism (Kolmen et al., 1997). Variables in each of communication and socialization domains were stepped into the regression equation according to the hierarchy of the ADI-R. That is many items in

these two domains of the ADI-R progress from behaviors demonstrated early on in development (e.g., eye gaze) to behaviours seen later on (e.g., separation anxiety) (Lord et al., 1994). Items were added into the regression equation according to developmental progression. The domain of interest/behaviours did not appear to be clearly organized according to such a progression thus stepwise regression analyses were not performed in this particular domain area.

Chapter Four

Results

Demographic Information

The AGRE data files of 108 children between the ages of two and four were examined during the course of this study. Thirteen children were age two, 38 children were age three, and 57 were four years of age ($\underline{M}$ = 3.4, $\underline{SD}$ = .70). All of the participants had been formally diagnosed with Autistic Disorder. Demographic information was collected primarily from the Autism Diagnostic Interview-Revised (ADI-R; Lord, 1994). Additional information was obtained from pedigree trees developed by AGRE researchers for the purposes of AGRE's genetic research projects. Mothers acted as the respondents of the ADI-R for each child in this sample.

Nineteen pairs of siblings ($\underline{n}$=38) comprised the present sample. Within these 38 children, one pair was fraternal twins; one pair was identical twins and one pair were part of a set of triplets (the third triplet was unaffected and therefore not a part of the present study).

Of the other 70 participants, four children had an unaffected fraternal twin, while another four children were a part of the AGRE database as a result of being identified as an affected cousin. As a reminder all subjects were part of a genetic multiplex family unless they were an affected cousin ($\underline{n}$ =4) or identical twin subjects ($\underline{n}$ =2). These six children were considered to be part of a genetic simplex pedigree. Given discordant attachments across a caregiver's children (Berlin & Cassidy, 1999) and the fact that mothers (and fathers) do not necessarily develop the same attachment patterns to their children (Rosen and Burke, 1999), in conjunction with other studies

which found that parents accentuate the differences between their children with autism and other children (Maclean et al., 1999), data gathered from sibling pairs were included.

In terms of diagnosis 51 children had been diagnosed before or at the age of 3 while 57 children were diagnosed by age four. The first symptoms that generated most parental concern were a child's delay or deviance in speech and/or expressive language including possible deafness, failure to respond to sounds, or not understanding what was being said.

In order to gain a better sense of the development of the current sample, early developmental milestones were examined. The acquisition of these milestones both in the entire sample and within each group in relation to what is reported for the typically developing child is presented in Table 5. Developmental norms were determined from charts of motor and language development (Bayley, 1969; Craig & Kermis, 1995). Bowel control was considerably delayed in this sample, as only 2% achieved this milestone within the typical time period. The age of a child's first word was also delayed with only 18% of children achieving this milestone by 12 months of age. Information pertaining to the acquisition of first phrases represented an overall delay in the current sample's language development with only 5% of children acquiring this milestone in the typical developmental range.

Motor milestones appeared to be developing appropriately in this sample of children as 88% of children were reported to have been able to sit upright by 8 months of age and 92% of children were capable of walking without assistance at 17 months (see Table 6). Overall minimal differences existed between groups in relation to the

Table 5

Summary of Demographic Data (N=108)

Variable	%
Age	
Two years	12
Three years	35
Four years	53
Gender	
Male	76
Female	24
Sibling Participants	
Non-twin Brother/Sister	29
Identical Twin	2
Fraternal Twin	2
Part of a Triplet Set	2
Total	35
Non-Sibling Participants	
Affected Cousin	4
Affected Twin	4
Other[a]	57

Note. Other[a] refers to children who were neither an affected cousin nor twin, and had no sibling participating in the study.

Table 6

Frequency of Sample and Particular Group Characteristics in Relation to the Typical Age Expected in Completing Developmental Milestones (N=108)

Milestone	Frequency	Typical Age of Completion
Bowel Control	1 (A)	36 months
First Word	19 (A11, B8)	12 months
First Phrases	5 (A2, B3)	24 months
Sat Unaided	95 (A43, B52)	8 months
Walk Unaided	99 (A44, B55)	17 months

Note. Typical age of expected completion was taken from Craig & Kermis (1995) and Bayley (1969).

A=Younger group, B=Older Group

acquisition of developmental milestones. It is also important to note that cognitive information was unavailable in this sample as such information was not gathered by the AGRE research team. Previous studies utilizing affected families have stratified samples using language skills (Buxbaum et al., 2001). Age of a child's first word was examined in the younger and the older group, given that the achievement of useful expressive language by the age of five years was the most powerful predictor of both behavioral and vocational outcome (Lord & Paul, 1997). In this study, mean averages for all children were unavailable, as many had not achieved this developmental milestone. The average age of acquisition of the first word was 22 months (n=34) for the younger group and 29 months (n=46) for the older group. Differences emerging here likely reflect the disparity in numbers across group comparison.

Severity of symptomatology was also examined across these two groups. In meeting the minimum criteria for a diagnosis of autism in each ADI-R domain, a total score of 21 for a verbal child and 20 for a nonverbal child is needed. The higher the ADI-R algorithm score, the more severe the symptomatic presentation. The younger and the older groups did not differ in the severity level of when using the means of the ADI-R total diagnostic algorithm scores (Younger, M = 37.35 and for older, M = 37.41). Moderately high symptom severity was demonstrated in both the younger and the older group.

Descriptive Statistics

In the next section descriptive analyses pertaining to the characteristics of the sample are provided to assist the reader in better comprehending the essence of the

child population utilized. The clinical interpretation of these results is in the discussion section of this document. Communication, social and interest/behavioural variables are described in Tables 7, 8, and 9. Group variables are classified with an "A" for the younger group (Group A) and "B" for the older group.

It is important to note that in the communication domain, three variables were dropped due to the nature of the emerging data. Variables which assessed reciprocal conversation, talk expressing interest, and communicative speech had a considerable proportion (53-80% of the group) of '8' codings meaning 'Not Applicable'. The researcher was unable to determine the meaning of these results, as an '8' code represents three different interpretations as described in Table 3 of the Methods Section. As a result these variables were not utilized in the analyses of the present study.

Descriptive information pertaining to the variables within each domain is offered. Frequencies and percentages of reported responses in each of the categories are reported. In order to provide the reader with additional clarity with regard to typical versus atypical behaviour, the variables pertaining to definite and severe abnormality were combined and provided in brackets. The rationale for doing so lies in the reliability of the ADI-R (Lord et al., 1994). When assessing for autism responses of '2' and '3' are coded as '2' to increase reliability of this measure. Thus it was determined that offering descriptive information in this format would aid the reader in comprehending the oddities of the present sample. Highlighted information is discussed in each domain. Additional details are summarized in tables of descriptive findings.

Table 7

Description of Communication Variables

Variable	Description
Social Vocalization	Vocalization with others just to be social or friendly rather than to express a need or provide information
Spontaneous Pointing	Pointing utilized as spontaneous communication, initiated by the child to express interest or show something, instead of a manner in which to obtain an object .

Note. Drawn from ADI-R protocol description (Lord, Rutter, Le Couteur, 1994).

Table 8

Description of Socialization Variables

Variable	Description
Eye Gaze	The use of direct eye gaze to communicate and their responses to others' attempts to 'catch' others' eye.
Social Smile	Spontaneous smiling directed at a variety of others, including smiling back if smiled at, smiling in response to what someone else says or does, and smiling when approached.
Greeting	In everyday situations, socio-emotional greeting response to reunion with someone known well by the child.
Show	Showing and directing attention
Excite	Sharing of others' excitement and pleasure.
Separation Anxiety	Overt expression of distress upon separation and pleasure upon reunion

Note. Drawn from ADI-R protocol description (Lord, Rutter, Le Couteur, 1994).

Table 9

Description of Interest/Behavioural Variables

Variable	Description
Unusual Preoccupation	An interest that is odd or peculiar in quality, intensity, is repetitive or stereotyped and lacks social features.
Change	Extreme, marked reactions to minor changes in relation to a child's carrying on daily activities in terms of routine and/or personal environment.
Ritualistic	Fixed sequences that are performed "as if" the child feels pressure to complete them in a particular order.
Object	An attachment, interest, and dependence on a particular and unusual object

Note. Drawn from ADI-R protocol description (Lord, Rutter, Le Couteur, 1994).

Communication domain. Considerable atypicalities emerged in the variables of social vocalization and spontaneous pointing. Definite or severe abnormalities in the area of social vocalizations were reported in 57% of the younger group and 47% of the older group (see Table 10). For spontaneous pointing, 80% of Group A and 47% of Group B had such abnormalities (see Table 11). Such results fit with the apparent delays in age of first word and use of first phrases described in the early developmental coding section of the results (see Table 6).

Socialization domain. Considerable atypicalities were demonstrated throughout this area. For eye gaze 47% of the younger group and 56% of the older group showed eye gaze that was somewhat abnormal. Typical eye gaze was reported in 20% of the younger group and 26% in the older group (See Table 12). Similar to the results of eye gaze, typical social smiling was seen in 28% of the children in each group with some abnormalities in 40% of Group A and 47% in Group B (see Table 13).

For greeting behaviour the majority of respondents reported the existence of spontaneous greeting behaviours. Definite abnormality was more frequently demonstrated in the younger group (26%) than in the older group (15%) (see Table 14).

When exploring children's ability to show and direct attention definite abnormalities were revealed (72% of Group A and 71% of Group B). Twelve percent of caregivers in each group also reported regular showing of objects by the child bringing things to them and directing their attention (see Table 15).

In examination of children's abilities to share in another's pleasure and

Table 10

Frequencies and Percentages of Codes of the Communication Variable Assessing Social Vocalization in Each Group (N=108)

Variable	Group	Code	N	%
Social Vocalizations	A	0	8	16
		1	13	26
		2	16	31
		3	13	26
		(2+3)	(28)	(57)
		8	1	2
	B	0	6	11
		1	20	35
		2	19	33
		3	8	14
		(2+3)	(27)	(47)
		8	4	7

Note. Percentages were rounded up to the nearest whole number and are calculated within each group.

Legend

0:	Behaviour is/was present
1:	Behavior is/was present in abnormal form, but not sufficiently severe, frequent or marked to meet criteria for '2'
2:	Definite abnormality
3:	A more severe manifestation of '2'
(2+3)	Variables 2 and 3 combined to depict considerable abnormality
8:	Not applicable

Drawn from ADI-R protocol description (Lord, Rutter, Le Couteur, 1994).

Table 11

Frequencies and Percentages of Codes of the Communication Variable Assessing Spontaneous Pointing in Each Group (N=106)

Variable	Group	Code	N	%
Spontaneous Pointing	A	0	2	4
		1	7	14
		2	41	80
		8	1	2
	B	0	10	18
		1	18	32
		2	27	47

Note. Percentages were rounded up to the nearest whole number and are calculated within each group. Data missing for 2 subjects in Group B.

Legend

0:	Behaviour is/was present
1:	Behavior is/was present in abnormal form, but not sufficiently severe, frequent or marked to meet criteria for '2'
2:	Definite abnormality
8:	Not applicable

Drawn from ADI-R protocol description (Lord, Rutter, Le Couteur, 1994).

Table 12

Frequencies and Percentages of Codes of the Socialization Variable Assessing Eye Gaze in Each Group (N=108)

Variable	Group	Code	N	%
Eye Gaze	A	0	10	20
		1	24	47
		2	13	26
		3	4	8
		(2+3)	(17)	(34)
	B	0	15	26
		1	32	56
		2	9	16
		3	1	2
		(2+3)	(10)	(18)

Note. Percentages were rounded up to the nearest whole number and are calculated within each group.

Legend

0:	Behaviour is/was present
1:	Behavior is/was present in abnormal form, but not sufficiently severe, frequent or marked to meet criteria for '2'
2:	Definite abnormality
3:	A more severe manifestation of '2'
(2+3)	Variables 2 and 3 combined to depict considerable abnormality

Drawn from ADI-R protocol description (Lord, Rutter, Le Couteur, 1994).

Table 13

Frequencies and Percentages of Codes of the Socialization Variable Assessing Social Smile in Each Group (N=108)

Variable	Group	Code	N	%
Social Smile	A	0	14	28
		1	20	40
		2	14	28
		3	3	6
		(2+3)	(17)	(34)
	B	0	16	28
		1	27	47
		2	11	19
		3	3	5
		(2+3)	(14)	(24)

Note. Percentages were rounded up to the nearest whole number and are calculated within each group.

Legend

0:	Behaviour is/was present
1:	Behavior is/was present in abnormal form, but not sufficiently severe, frequent or marked to meet criteria for '2'
2:	Definite abnormality
3:	A more severe manifestation of '2'
(2+3)	Variables 2 and 3 combined to depict considerable abnormality

Drawn from ADI-R protocol description (Lord, Rutter, Le Couteur, 1994).

Table 14

Frequencies and Percentages of Codes of the Socialization Variable Assessing Greeting Behaviour in Each Group (N = 108)

Variable	Group	Code	N	%
Greeting	A	0	19	37
		1	19	37
		2	12	24
		3	1	2
		(2+3)	(13)	(26)
	B	0	25	44
		1	24	42
		2	6	11
		3	2	4
		(2+3)	(8)	(15)

Note. Percentages were rounded up to the nearest whole number and are calculated within each group.

Legend

0:	Behaviour is/was present
1:	Behavior is/was present in abnormal form, but not sufficiently severe, frequent or marked to meet criteria for '2'
2:	Definite abnormality
3:	A more severe manifestation of '2'
(2+3)	Variables 2 and 3 combined to depict considerable abnormality

Drawn from ADI-R protocol description (Lord, Rutter, Le Couteur, 1994).

Table 15

Frequencies and Percentages of Codes of the Socialization Variable Assessing Showing and Directing Attention in Each Group (N=108)

Variable	Group	Code	N	%
Show	A	0	6	12
		1	8	16
		2	22	43
		3	15	29
		(2+3)	(37)	(72)
	B	0	7	12
		1	10	18
		2	30	53
		3	10	18
		(2+3)	(40)	(71)

Note. Percentages were rounded up to the nearest whole number and are calculated within each group.

Legend

0:	Behaviour is/was present
1:	Behavior is/was present in abnormal form, but not sufficiently severe, frequent or marked to meet criteria for '2'
2:	Definite abnormality
3:	A more severe manifestation of '2'
(2+3)	Variables 2 and 3 combined to depict considerable abnormality

Drawn from ADI-R protocol description (Lord, Rutter, Le Couteur, 1994).

excitement, it was revealed that some form of abnormality was presented, whether in a minimal or severe fashion in the majority of the respondents' endorsements. Typical behaviour was only reported in 14% of respondents in Group A and 19% of respondents in Group B (see Table 16).

The final socialization variable which examined separation anxiety revealed that the majority of respondents reported expressions of appropriate distress upon separation. Little or no apparent reaction to separation was evidenced in 14% of the younger group and 14% of the older group. A few respondents in each group indicated that this behaviour was 'Not Applicable' (see Table 17).

Interests/Behaviours domain. Four variables assessed interest/behaviour. For unusual preoccupations, 24% of the younger group and 30% of the older group demonstrated definite (if not severe) manifestations of these types of preoccupations. However the majority of respondents reported that typical behaviour was present (see Table 18).

For difficulties with minor change in routine behaviour or personal environment 18% in Group A and 32% of Group B reported definite and unusual reactions to minor changes in that unusual efforts were made to avoid changing minor aspects of routines without substantial interference in family life. For two children (one in each group) difficulties in this area substantially interfered with or impaired family activities (See Table 19).

Definite (and even severe) presentations of ritualistic and compulsive behaviour were demonstrated in 18% of the younger group and 30% of the older group. (See Table 20). Finally in examination of unusual object use in this sample,

Table 16

Frequencies and Percentages of Codes of the Socialization Variable Assessing Sharing in Another's Excitement and Pleasure in Each Group (N=108)

Variable	Group	Code	N	%
Excite	A	0	7	14
		1	20	39
		2	13	26
		3	11	22
		(2+3)	(23)	(48)
	B	0	11	19
		1	21	37
		2	16	28
		3	9	16
		(2+3)	(25)	(44)

Note. Percentages were rounded up to the nearest whole number and are calculated within each group.

Legend

0:	Behaviour is/was present
1:	Behavior is/was present in abnormal form, but not sufficiently severe, frequent or marked to meet criteria for '2'
2:	Definite abnormality
3:	A more severe manifestation of '2'
(2+3)	Variables 2 and 3 combined to depict considerable abnormality

Drawn from ADI-R protocol description (Lord, Rutter, Le Couteur, 1994).

Table 17

Frequencies and Percentages of Codes of the Socialization Variable Assessing Separation Anxiety in Each Group (N=106)

Variable	Group	Code	N	%
Separation Anxiety	A	0	35	69
		1	7	14
		2	7	14
		8	1	2
	B	0	40	70
		1	7	12
		2	8	14
		8	1	2

Note. Percentages were rounded up to the nearest whole number. Percentages are calculated within each group. Data missing for two subjects.

Legend

0:	Behaviour is/was present
1:	Behavior is/was present in abnormal form, but not sufficiently severe, frequent or marked to meet criteria for '2'
2:	Definite abnormality
8:	Not applicable

Drawn from ADI-R protocol description (Lord, Rutter, Le Couteur, 1994).

Table 18

Frequencies and Percentages of Codes of the Interest/Behaviours Variable Assessing Unusual Preoccupation in Each Group (N=106)

Variable	Group	Code	N	%
Unusual Preoccupation	A	0	35	69
		1	4	8
		2	7	14
		3	5	10
		(2+3)	(12)	(24)
	B	0	28	49
		1	11	19
		2	14	25
		3	3	5
		(2+3)	(17)	(30)
		9	1	2

Note. Percentages were rounded up to the nearest whole number. Percentages are calculated within each group.

Legend

0:	Behaviour is/was present
1:	Behavior is/was present in abnormal form, but not sufficiently severe, frequent or marked to meet criteria for '2'
2:	Definite abnormality
3:	A more severe manifestation of '2'
(2+3)	Variables 2 and 3 combined to depict considerable abnormality
9:	Unknown

Drawn from ADI-R protocol description (Lord, Rutter, Le Couteur, 1994).

Table 19

Frequencies and Percentages of Codes of the Interest/Behaviours Variable Assessing Difficulty with Change in Routine Behavior or Personal Environment in Each Group (N=108)

Variable	Group	Code	N	%
Change	A	0	32	63
		1	10	20
		2	8	16
		3	1	2
		(2+3)	(9)	(18)
	B	0	30	53
		1	9	16
		2	17	30
		3	1	2
		(2+3)	(18)	(32)

Note. Percentages were rounded up to the nearest whole number. Percentages are calculated within each group.

Legend

0:	Behaviour is/was present
1:	Behavior is/was present in abnormal form, but not sufficiently severe, frequent or marked to meet criteria for '2'
2:	Definite abnormality
3:	A more severe manifestation of '2'
(2+3)	Variables 2 and 3 combined to depict considerable abnormality

Drawn from ADI-R protocol description (Lord, Rutter, Le Couteur, 1994).

Table 20

Frequencies and Percentages of Codes of the Interest/Behaviours Variable Assessing Ritualistic/Compulsive Behavior in Each Group (N=108)

Variable	Group	Code	N	%
Ritualistic	A	0	39	77
		1	3	6
		2	7	14
		3	2	4
		(2+3)	(9)	(18)
	B	0	30	53
		1	10	18
		2	13	23
		3	4	7
		(2+3)	(17)	(30)

Note. Percentages were rounded up to the nearest whole number. Percentages are calculated within each group.

Legend

0:	Behaviour is/was present
1:	Behavior is/was present in abnormal form, but not sufficiently severe, frequent or marked to meet criteria for '2'
2:	Definite abnormality
3:	A more severe manifestation of '2'
(2+3)	Variables 2 and 3 combined to depict considerable abnormality

Drawn from ADI-R protocol description (Lord, Rutter, Le Couteur, 1994).

20% of the younger group and 18% of the older group had definite abnormalities related to unusual attachments to objects (See Table 21).

Taken together considerable developmental abnormalities were present in at least two domains of functioning with the areas of communication and socialization evidencing the most atypicalities in this clinical sample. In the area of interests/behaviours it *appears* that the majority of children presented in a normative and typical fashion for the specific items examined. Yet as we recall, for a diagnosis of autism to be met, children need to meet criteria in this particular area of function, by exhibiting some form of abnormality. It may be the case then that, for children in this sample abnormalities were demonstrated for other ADI-R variables which assess restricted repertoire of interests/behaviours (e.g. verbal rituals and/or unusual sensory interests).

Secure base. In examination of the ADI-R variable which assessed secure base behaviour scores were scattered across codes. To recap this item assessed: 1) the child's awareness of the caregiver's location and attention to it, as evidenced by seeking proximity and checking back, and 2) the child's ability to then go on to interact or explore a new situation. Typical behaviour was reported for 28% of those in Group A and for 37% of those in Group B, while some abnormality was reported in 29% of the younger group and 28% of the older group. Thirty-nine percent of Group A and 33% of Group B were reported to demonstrate definite (if not severe) impairments of secure base behaviour (See Table 22).

Relationships Among Variables

Correlation analyses were conducted to assess the relationships between

Table 21

Frequencies and Percentages of Codes of the Interest/Behaviours Variable Assessing Unusual Use of Objects in Each Group (N=108)

Variable	Group	Code	N	%
Object	A	0	36	71
		1	3	6
		2	9	18
		3	1	2
		(2+3)	(10)	(20)
		7	2	4
	B	0	40	70
		1	6	11
		2	8	14
		3	2	4
		(2+3)	(10)	(18)
		7	1	2

Note. Percentages were rounded up to the nearest whole number. Percentages are calculated within each group.

Legend

0:	Behaviour is/was present
1:	Behavior is/was present in abnormal form, but not sufficiently severe, frequent or marked to meet criteria for '2'
2:	Definite abnormality
3:	A more severe manifestation of '2'
(2+3)	Variables 2 and 3 combined to depict considerable abnormality
7:	Interested in "infant" toys, such as music boxes or rattles, but play is with a variety of objects and not in a highly stereotypic fashion

Drawn from ADI-R protocol description (Lord, Rutter, Le Couteur, 1994).

Table 22

Frequencies and Percentages of Reported Corresponding Code Assessing Secure Base Behaviour in Each Group (N=106)

Variable	Group	Code	N	%
Secure	A	0	14	28
		1	15	29
		2	4	8
		3	16	31
		(2+3)	(20)	(39)
		7	1	2
	B	0	21	37
		1	16	28
		2	3	5
		3	16	28
		(2+3)	(19)	(33)

Note. Percentages were rounded up to the nearest whole number. Percentages are calculated within each group. Data missing for two subjects.

Legend

0:	Behaviour of type specified in the coding is/was present
1:	Behavior of type specified is/was present in abnormal form (or 'lack of behaviour' was present), but not sufficiently severe, frequent or marked to meet criteria for '2'
2:	Definite abnormality of the type specified that meets/met the criteria given for that coding
3:	A more severe manifestation of '2'
(2+3)	Variables 2 and 3 combined to depict considerable abnormality
7:	Excessively clingy across a variety of situations

Drawn from ADI-R protocol description (Lord, Rutter, Le Couteur, 1994)

variables in order to offer additional support to results demonstrated in the inferential statistics. Pearson correlation coefficients were calculated in order to determine the relationship among the predictor variables which were theorized to affect secure base behaviour. Secure base behaviour, identified as Secure Base A and Secure Base B, was defined by item 59 of the ADI-R.

In the younger group secure base behaviour was significantly positively correlated with the items social smile, greeting behaviour, and sharing in another's excitement and pleasure while in the older group, greeting behaviour, showing and directing attention, and separation anxiety were positively correlated with secure base behaviour. A small negative relationship was also demonstrated between secure base behaviour and unusual attachment to objects in the older group.

In summary, social behaviors were most positively related to demonstrations of secure base in both groups (see Table 23).

Hypothesis One

A one-way analysis of variance (ANOVA) was performed in order to determine if significant differences existed between each group and the dependent variable (Secure Base A and Secure Base B). Each child had received a score in relation to secure base behaviour. Levene's Test for Equality of Variances was performed to determine if equality of variances could be assumed. As a result of Levene's Test, homogeneity of variances was demonstrated, (1, 104) = .05, p = .83. However, hypothesis one was refuted, as significant differences did not exist between the two groups of younger and older children, F (1, 104) = .5, p = .48. (See Table 24).

Hypotheses Two, Three, and Four

Table 23

Correlations Among the Secure Base Variables and Other Dependent Variables for Children in Both Groups (N=106)

Variables	r
Secure Base A	
Social Smile	.38*
Greeting Behaviour	.33*
Excite	.42*
Secure Base B	
Greeting	.35*
Show/Direct	.32*
Separation Anxiety	.57*
Unusual Attachment	-.27*

Note: *p < .05

Table 24

One-way Analysis of Variance Assessing Secure Base Between Group A and Group B (N=106)

Source	SS	*df*	*MS*	*F*	*p*
Between subjects	.76	1	.76	.50	.48
Within subjects	158.68	104	1.53		
Total	159.44	105			

Univariate regression analyses were conducted to examine which individual variables in each domain were significant in predicting change in the dependent variable, secure base behaviour. In the communication domain neither variables were found to significantly impact attachment behaviour in the younger and older groups. Conversely multiple variables in the socialization domain were statistically significant. In the younger group Excite, F (1, 48) = 10.52, $p < .05$, Adjusted R^2= .16; Social Smile, F (1, 48) = 8.07, $p < .05$, Adjusted R^2= .13; and Greeting Behaviour, F (1, 48) = 6.02, $p < .05$, Adjusted R^2= .09; were revealed to impact this domain of functioning (see Table 25). In the older group, Separation Anxiety, F (1, 54) = 24.87, $p < .05$, Adjusted R^2= .31; Greeting Behaviour, F (1, 54) = 7.29, $p < .05$, Adjusted R^2= .10; and Show, F (1, 54) = 6.08, $p < .05$, Adjusted R^2= .08 were significantly related to secure base behaviour (see Table 26). In the domain of interests/behaviours, Object, F (1, 54) = 4.20, $p < .05$, Adjusted R^2= .06 had some impact on attachment behaviour in the older group (see Table 27).

Step-wise multiple regression analyses were also performed to determine which communication abilities and social skills were most strongly associated with secure base behavior. Tables 7 and 8 describe the variables examined within each of these two domains in the younger and older group. In this form of analyses, the least significant predictor variable is removed one step at a time until all variables which are found to uniquely contribute to the change in the dependent variable have been revealed (Beardslee et al., 1996). Variables are entered into the step-wise regression equation according the order they occur in the ADI-R. Collinearity diagnostics were also conducted at this time to assess possible interrelationships between independent

Table 25

Summary of Significant Univariate Regression Analyses in the Socialization Domain of Group A (n=49)

Variable	*B*	*SE B*	β
Social Smile	.52	.18	.38*
Greeting Behaviour	.50	.20	.33*
Excite	.54	.17	.42*

Note. *p < .05

Table 26

Summary of Significant Univariate Regression Analyses in the Socialization Domain of Group B (n=54)

Variable	*B*	*SE B*	β
Greeting Behavior	.54	.20	.35*
Show	.44	.18	.32*
Separation Anxiety	.96	.19	.57*

Note. *p < .05

Table 27

Summary of Significant Univariate Regression Analyses in Group B Within the Interest/Behaviour Domain (n=54)

Variable	*B*	*SE B*	*β*
Object	-.38	.19	-.27*

Note. *p < .05

variables. Tolerance was found to be well above .20 and Variance-inflation factor (VIF) was well below 4 in both step-wise analyses, thus multicollinearity was not revealed to be a problem during these statistical procedures (Fox, 1991).

In examination of hypothesis surprisingly no communication variables were found to significantly affect a child's demonstrations of secure base behaviour in either the younger or older group. In exploring hypothesis three which examined the socialization domain in relation to demonstrations of a secure base, Excite, F (1, 48) = 10.52, $p < .05$, Adjusted $R^2 = .16$ was revealed to impact this domain of functioning in the younger group (see Table 28). As Separation Anxiety, F (1, 54) = 24.87, $p < .05$, Adjusted $R^2 = .31$ then Greeting Behavior was stepped into the regression equation, F (2,52) = 19.18, $p < .05$, Adjusted $R^2 = .41$, these variables together significantly affected secure base behaviour in the older group. Such findings for these two variables were identical to those revealed during the univariate analyses within this domain (See Table 29).

Lastly in examination of hypothesis four, none of the four variables, which assessed interests and behaviours were found to significantly affect children's demonstrations of a secure base in both groups. It is important to note that although statistical significance was established in these analyses the clinical relevance of such significance will vary, depending on the amount of variance accounted for in each of the aforementioned results. For instance Secure Base item A and the predictor variable measuring shared excitement in another's pleasure accounted for 16% of the variance in the younger group. In the older group, the socialization variables of Separation Anxiety accounted for 31% of the variance in secure base behaviour and

Table 28

Summary of Significant Results in Step-wise Regression Analysis in Group A (n=49)

Variable	*B*	*SE B*	*β*
Step 1			
Excite	.54	.17	.42*

Note. *p < .05

Table 29

Summary of Significant Step-wise Regression Analysis in Group B (N=54).

Variable	*B*	*SE B*	*β*
Step 1			
Separation Anxiety	.96	.19	.57*
Step 2			
Separation Anxiety	.94	.18	.55*
Greeting Behavior	.51	.16	.33*

Note. *p < .05

when Greeting Behaviour was stepped in, both variables combined accounted for 41% of the variance in attachment behaviour. Overall, the single variable of Separation Anxiety was revealed to demonstrate the most significant impact on secure base variables in the older group.

Summary

In examination of the four hypotheses outlined in this study primary findings revealed that significant differences did not exist between the younger and the older group in relation to secure base behaviour. Differences however did emerge between groups when specific domains were examined. That is in the younger group the socialization variable of shared excitement in another's pleasure was revealed to most impact attachment behaviour. Socialization variables of separation anxiety and greeting behaviour together were revealed to have the most affect on demonstrations of a secure base in the older group. Unusual attachment to objects was revealed to have a slight impact on demonstrations of secure base behaviour. In both groups, none of the communication variables significantly affected attachment behavior.

Chapter Five

Discussion

The purpose of this study was to examine variables related to secure base behaviour in children with autism. Differences across groups and their use of attachment behavior were predicted. This hypothesis was unsupported, yet it was revealed that particular socialization behaviours which impacted attachment behaviour differed across groups.

Attachment theory emphasizes that variables related to socio-emotional interchange impact the parent-child dyad. Social behaviors are not seen as acting in isolation but rather interacting in conjunction with other developmental processes. What was affirmed in the present study were the findings that particular social variables assessing separation anxiety, shared excitement in another's pleasure, greeting behaviour, showing and directing attention are related to, and appear to significantly affect the presentation of attachment behaviour

Past research examining attachment behaviour has utilized different ways of classifying attachment quality. Differentiated/disorganized attachment quality has been used (Capps et al., 1994), while others have deemed that the majority of children with autism display secure attachments to their primary caregiver (Rogers et al., 1991; 1993). Although this particular study did not attempt to examine attachment quality per se, what it did reveal was that some children with autism demonstrate secure base behavior that is seen as typical, while the majority do not. Given the range of secure base codings which emerged in the present findings, it seems that describing and

characterizing attachment behaviour within this clinical population is a challenging task. How can we best describe attachment behaviour in children with autism?

Primary Research Question

The primary research questions explored differences between the younger group and the older group in relation to secure base behavior, predicting differences in their use of a secure base. This hypothesis was not supported in the research findings. Such a result presents as an interesting and unexpected finding given the social and communication deficits, odd and unusual behavioural presentations, etiological variability, and a wide presentation variation of symptom severity in children with autism. It was expected that differences would emerge between the younger and older group as a child's presentation of autism may become more pronounced and more clearly identifiable as a child gets older. With the considerable growth presented in the first five years of life and the demonstrated deviance in developmental trajectories, it seems plausible that differences could emerge between children within this age span. As well a parent's perceptions of the deviancies displayed in their child's behaviour could affect ratings of secure base behaviour.

It may be that qualitative differences between children, which are inherently a part of Autistic Disorder, may not be directly impacting the demonstration of secure base behaviour in this young sample. Instead other variables related to attachment behaviour offer different pieces to secure base behavioural outcome. That is although attachment behaviour seems to be similar across groups, it is possible that the trajectories which lead to attachment behaviour differ. Further explanation of this

interpretation, along with the differing developmental variables which impacted attachment behaviour is discussed in the next section of this chapter.

Another reason for no significant difference occurring between groups could have been due to the fact that similar numbers of children in each group display different kinds of attachment behaviours (Ainsworth et. al., 1978). That is when we examine the present classifications of the quality of the attachment style, and the variety of behaviours demonstrated in each category (i.e. secure versus insecure, see Appendix B), it may be the case that in each group such styles were proportionally represented (van Ijzendoorn, Goldberg, Kroonenberg, & Frenkel, 1992) in an abnormal fashion. Although differences in attachment quality were not formally assessed in the present study, drawing on present classification systems in light of these results appears to be helpful in the interpretation of findings.

The construct of age did not appear to be a determining factor in differentiating these two groups. The considerable variability within each group likely impacted the outcome of the present study. Another explanation for lack of differences may be due to the fact that the relationship between chronological age and developmental age is more variable in children with autism (Wenar, 1994) than other children. Given the symptom variability along with large ranges in intellectual abilities (Volkmar, 1997; Rutter & Schopler, 1987), it may be that such differences in developmental processes impacted these two samples resulting in little distinction between them. For example typically developing three and four-year-old children likely demonstrate appropriate attachment behaviour (coded as '0' or even '1' on the ADI-R, although a score of 1 would be unlikely). Scores of 2, 3, or 8 would likely not emerge in a normative

sample. Yet what remains a further distinction between the present sample and a typical age-matched group is the fact that the use of the term 'abnormal' is not part of the language used to currently describe attachment style. Terminology delineating differentiated/disorganized attachment quality, for instance, does not incorporate or describe attachment behaviour in 'abnormal' language.

On a dissimilar vein, it is also plausible that the number of qualitative differences emerging in secure base behaviour could not be definitively examined using the ADI-R and use of a more sensitive measure of attachment behaviour such as Lamb's (1984) continuous rating scale may have detected differences. It is important to remember that the ADI-R is not specifically designed to assess attachment behaviour in an exhaustive manner, but rather it offers a comprehensive approach to the diagnosis of Autistic Disorder.

In examination of the developmental milestones and symptom severity, it appears that minimal differences emerged in these two groups. This provides relative support to the notion that secure base behaviour did not present in a significantly different manner across both groups. In comparing the findings related to use of a secure base with the present literature it appears that the variations of secure base presentation within each group (codes of 0-3) is similar to studies which find children with autism falling into both the classifications of secure and insecurely attached (Rogers, Ozonoff, & Maslin-Cole, 1993).

In the present study 33% of children (14 in Group A and 21 in Group B) were classified as utilizing the parent as a secure base, seeking proximity when approached by a stranger and checking in when in a new situation. Once settled, these children

were reported to then interact or explore their environments. Such a classification is described as typical and secure and appears to be *lower than* Rogers et al (1993) who found that 50% of their sample of children with autism demonstrated secure attachment quality as measured by a combination of the Strange Situation (Ainsworth et al., 1979) and Lamb's (1984) Rating Scale. Unlike Capps et al (1994), who chose to ignore autistic-like behaviour, the present study in using the ADI-R to examine attachment behavior, looked to account for qualitative abnormalities in this presentation of a secure base.

Secondary Research Questions

Previous studies reported that differences existed in attachment behaviour in relation to developmental level (Rogers et al., 1991). In this sample although level of autism severity was the same across both groups, different factors accounted for variability in secure base behaviour. Such distinction could be a result of various relationships across developmental milestones and complex interactions within such developmental process interactions. Namely differences across deviant developmental trajectories may lead to certain variables impacting attachment behaviors while others do not.

Communication domain. Communication is seen as part on the complex dyad of attachment. Just as the use of proximity enables a child to gain some sense of security in her environment, communication facilitates interpersonal dynamics and plays a significant role in a child's ability to engage with the parent. According to Cicchetti et al., (1995) all domains of the mind coordinate and integrate with attachment. Research question two explored the impact of communication abilities in

relation to secure base behavior. In each group it was predicted that the communication skills of a) social vocalization, b) reciprocal conversation, c) talk expressing interest in others, d) communicative speech, e) and pointing to express interest were significantly related to a child's use of a 'secure base'. Given the number of 'Not Applicable' coding emerging in the variables of reciprocal conversation, talk expressing interest in others, and communicative speech, these variables were dropped and not furthered examined in the present study. However the communication variables of social vocalization and spontaneous pointing to express interest were formally assessed.

In the present study surprisingly none of the communication variable were found to significantly impact secure base behaviour in the older group. Such a finding is unexpected, given that social communication has been shown to be inherently a part of attachment. Yet in examination of the results of social vocalization and spontaneous pointing, it is clear that the majority of children were identified as demonstrating definite if not severe abnormalities in these areas. Perhaps such atypicalities affect, in some way, socio-emotional exchanges between child and caregiver. It is probable that the other communication variables may have had an impact, such as the variables that were dropped from the study. However dissimilar to what one would expect from a typical sample, the specific communicative variables in this sample did not *seem* to impact attachment behaviour. More examination in this area is needed to better comprehend the relationship between communicative factors and abnormal (or typical) use of a secure base.

Socialization domain. Research question three explored the impact of social skills in relation to secure base behavior. In each group, it was predicted that the social milestones of: a) direct gaze, b) social smiling, c) greeting d) showing and directing attention, e) separation anxiety, and f) sharing other's pleasure and excitement were significantly related to a child's use of a secure base.

In the younger group, the variables assessing social smiling, shared excitement in another's pleasure, and greeting behaviour significantly impacted children's demonstrations of secure base behaviour. To begin smiling is seen as considerably rewarding to new mothers, interpreting such as signs of affection (Eibl-Eibesfeldt, 1989). Once smiling is responded to by a caregiver, it is viewed as a way for the child to encourage the caregiver to remain close-by, so the behaviour continues (Craig & Kermis, 1995). It is understandable that social smiling would impact secure base behaviour.

It has been previously reported that children with autism display emotional deficits (Fein & Waterhouse, 1987); they are less likely to combine smiling with eye contact and are less inclined to smile in response to a mother's smiles (Dawson, 1990). Perhaps the existence of the social smile, although presented in an abnormal fashion by the majority of children in this study, remained important and potentially offered some form of emotional connectedness to caregivers. Even though the exhibition of such was potentially less frequent than typically developing and developmentally delayed children, social smiling was found to affect attachment behavior in the present sample.

Next it seems plausible that a child's ability to share excitement or pleasure

in another, particularly a primary caregiver, was integral to the socio-emotional response patterns of attachment behavior in the present research findings. This variable was found to have a significant impact on attachment behaviour in the younger group. One could argue that a child's ability to express interest in another speaks to the reciprocal nature of social relationships, especially those that are more inherently emotionally involved, such as the parent-child dyad. If children are capable of responding to another's excitement and pleasure, they would then seem to be acting in the context of the relationship. Ironically children with autism exhibit impairments in socio-emotional communication (Sigman, 1989). It may be that if children choose not to respond, or seem to lack the awareness to respond to another's pleasure this could potentially hinder the presentation of attachment-related behavior. Thus it appears that this early developmental social milestone acts as a predictive element in the demonstration of attachment behaviours both in typically developing children and some children with autism.

Greeting behaviour investigated everyday socio-emotional greeting response to reunion with someone known well by the child. This variable was predictive of attachment behaviour in both groups. When exploring the findings related to greeting behaviour, it may be that such socio-emotional greeting promotes interrelatedness. If we examine the current literature on intersubjectivity, we see that "the self forms through relationships with others in a dialectic process" (Auerbach & Blatt, 2001, p. 1) as intersubjectivity looks to provide the essence of the dyadic piece of a social relationship. Having the ability to examine oneself through the development of a relationship, and thus in the context of one's attachment quality, one can see that lack

of interrelatedness can significantly impact one's ability to present in an attached manner. This construct, therefore, has been identified as a key element in the development of the caregiver-child relationship (Schore, 2001; Stern, 1995).

Unlike the younger group, the variable assessing separation anxiety significantly impacted secure base behaviour in the four-year-old group. Separation anxiety explored overt expression of distress upon separation and pleasure upon reunion. The finding that separation anxiety acted as a predictive factor in maternal ratings of secure base behaviour seems likely, given that some level of anxiety appears to be a normal part of the development of healthy and insecure attachment styles. Wenar (1994) describes that indiscriminate responsiveness gives way to selectivity between the sixth and ninth month, as infants demonstrate a strong preference for the mother and other special caretakers; this inner circle of caregivers can evoke great delight and most readily comfort the infant in times of distress. However negative affects are also associated with attachment. The first is separation anxiety when the mother leaves (Wenar, 1994). "Despite the label, the distress is not akin to fear, as are most anxieties, but is better described as anguish…that painful blend of protest and despair which wells up when a crucial source of pleasure disappears and one is helpless to bring it back…intense anxiety is part of normal development…attachment is never purely positive; it is inevitably a mixture of love and anguish and fear and anger… (Wenar, 1994, p. 35-36). According to Marvin and Britner (1999) by age four children are much less dependent on physical proximity and contact to maintain a sense of security and instead become comfortable spending time with others.

When one examines the ADI-R item pertaining to secure base behaviour (item 59), along with item 60, which explores separation anxiety, both items seem to be integral in the investigation of attachment in children with autism. Item 59 measures a child's behavioural demonstrations while item 60 investigates a child's emotional expression upon separation and reunion. Both items *seem* to act as separate pieces to the same construct, namely parent-child attachment. Yet separation anxiety did not emerge as accounting for variance in secure base demonstrations in the younger group. How is one to explain this finding?

This difference between groups was not explained by apparent abnormalities in separation anxiety. In the younger group, separation anxiety was typical in 69% of cases, while approximately 68% of this group (see Table 22) had some form of abnormalities in their secure base behaviour. Similarly in the older group, 70% of mothers reported that typical separation anxiety was demonstrated, while 61% (see Table 22) indicated some level of abnormality in her child's use of a secure base. Thus parent's perceptions of her child's level of anxiety upon separation seems typical in both groups, yet their behavioural demonstrations of their use of the mother as a base from which to explore presents in an abnormal fashion in the majority of cases.

Examination of the literature may be helpful in the interpretation of such a finding. According to Carlson and Sroufe (1995) attachment represents an essential normative process in early infant development. Attachment is also considered to be a primary organizing theme of early social development (Walters, Barett, & Feinstein, 1990). Bowlby's (1980) work discussed possible oddities present in a child's attachment behaviour, as he stated that psychopathology is viewed as an individual's

psychological development having deviated from the normal pathway, while attachment behaviour is organized within an individual's personality. If we are to draw from such statements to examine potential oddities in attachment behaviour due to developmental deviance associated with Autistic disorder, it would make sense that attachment behaviour may exist in a qualitatively distinct fashion, resulting in challenges in examining and identifying more classical attachment behaviors (Main & Solomon, 1990; 1986).

In examination of the results related to separation anxiety, demonstrations of attachment behaviour and overt emotional expressions are linked in the construct of attachment, but only in the older group. Subtle differences in the qualitative presentation of item 60 between the two groups, may have accounted for why separation anxiety was not found to be predictive in the younger group, but much appears to remain unexplained. Lastly, it should be noted that increased variability within the younger group may have also accounted for differences across groups in examination of the relationship between secure base and separation anxiety.

Developmental differences likely impacted the presentation of attachment-related behaviors (Rogers et al., 1991), resulting in differences across groups. Such differences emerged in examination of other variables which were found to predict attachment behaviour in each group. Although significant differences did not emerge in relation to attachment behaviour across groups, differences in the variables found to predict the presentation of secure base behaviour may contribute to the argument that developmentally deviant trajectories exist in examination of attachment behaviour

within this clinical population. The ADI-R was also capable of extrapolating these developmental variables in relation to the demonstrations of attachment.

The variable measuring shared excitement and pleasure did not impact the older group. Instead unlike the younger group, the variable which assessed the ability to show and direct attention significantly affected secure base behaviour. Shared excitement and pleasure appears to involve more emotionality than showing and directing attention, yet both involve joint attention capabilities, which involves focusing attention with another person on something in particular. Leekam et al. (2000) reported that difficulties with joint attention are found in adult-child relationships, and triadic (child-adult-object) dynamics in children with autism. Despite the differences emerging between the younger and the older group, results indicate that both of these variables had an impact on socio-emotional relationships in children with autism. It appears understandable that tasks which examine social communication are linked with attachment behaviour.

Interests/behaviours domain. Research question four investigated the impact of interests and behaviours in relation to secure base behavior. In each group it was predicted that the interests and behaviours of: a) unusual preoccupations b) difficulties with minor changes in subjects own routines or personal environment c) compulsions and rituals and d) unusual attachment to objects were significantly related to a child's use of a secure base.

In the younger group none of these four items were significantly related to secure base behaviour. In the older group unusual attachment to objects, found to be negatively related to attachment behaviour, accounted for only 6% of the variability.

With such a small percentage of the variance accounted for it difficult to interpret this negative relationship. It may be that a child's attachment to an atypical object affected parental perceptions in an inverse fashion. Perhaps difficulty in separating the child from their attachment object somehow impacted parents' views of how children use a caregiver as a secure base (i.e. as unusual attachment increased, perceptions of atypical secure base behaviour decreased). Developmental differences may have again arisen and resulted in differences emerging across the two groups.

Overall when we examine the responses of both groups in relation to the ADI-R interest/behaviour items, we see that a substantial percentage of children were reported to demonstrate typical behaviour. This result is surprising given that such behaviours are an essential part of a diagnosis of autism. Research conducted by Cox et al. (1999) found that their young sample of children with autism did not meet the cut-off score in this particular domain of the ADI-R, and alternative guidelines were followed as a result.

If we examine the DSM-IV criteria for Autistic Disorder, a restricted repertoire of interests and behaviours is an integral part of diagnosis. For caregivers who did not endorse the demonstration of peculiar behaviours in the interests/domains area it makes sense that their perceptions of their child's secure base behavior may have also been viewed as typical. Caregivers may have become "desensitized" or accustomed to their children's peculiar behaviour; thus not deeming behaviours as atypical. Given the young sample utilized in this study, stereotyped behaviour is likely to be less pronounced, as children may not look as behaviourally affected (Miller, 2002). The young child may not have developed certain behaviours yet (e.g., atypical language

use) and cannot exhibit odd use of them (Scamber, Rogers, & Wehner, 2001). According to Scamber et al. (2001), professionals and parents need to be sensitive to the absence of expected social and communicative behaviours rather than looking for oddities in behaviour and atypical language usage. Tanguay, Robertson, & Derrick (1998) even argued that oddities such as unusual preoccupations and compulsions are seen as challenges with joint attention and may be incorporated into the domain of social communication rather than considered stereotyped behaviours.

It seems likely that the extent and nature of the relationship between atypical interests/behaviours cannot be simply articulated. A complex relationship likely exists between qualitatively odd and repetitive behaviour and the demonstration of secure base behaviours.

The next section discusses limitations of the present study. Theoretical, treatment-focused, and research oriented implications are presented. Finally conclusions and final remarks are offered.

Limitations of the Current Study

The limitations of the current study include the use of a parent's rating of secure base behaviour instead of direct observations. Prior studies which explore attachment tend to examine attachment behaviours via observation. As a result caregivers' biases may have affected the results of this study and may be less accurate representations of attachment behaviour than direct observations of parent-child interactions. However even though direct observation is an essential part of diagnostic assessment, it can only assess behaviour manifest in a short time frame (e.g. scenarios of the Strange Situation, Ainsworth et al., 1978) instead of gaining critical information

of daily functioning (Lord et al., 1993). Accurate recall of information is also a limitation when questionnaires are utilized as they are affected by biases as previously mentioned, and the ability to recall information. What remains hopeful here is the fact that, when interviewers are well trained, recall bias can be moderated using the investigator-based techniques of triggering memories (Boelte & Poustka, 2000).

Small age differences between children ages 3 years 11 months, for example, and those children age 4 years poses some challenges in the discreet comparison of the two groups identified in this study. Such difficulties appear to be common in research utilizing age, as developmentally progressive and continuous behaviours are quantified at one point in time. In the present study, the format of the primary tool, the ADI-R, uses a separate category for children ages four-five; therefore differentiating three and four-year-old children.

The use of a database is considered a limitation, as errors can exist in gathering information from a source such as AGRE rather than collecting it directly from participants. The data was collected for a purpose other than that of the current study (i.e. genetics research). Secondary research data is less flexible in the examination of desired research questions as the examiner has access only to the information made available in the database. Interrater reliability was not examined over time (only when raters were trained) so it cannot be determined whether data collected earlier in the database was equivalent to data collected later on, or if it was affected by the tendency of interviewers to drift from standardized procedures.

In using AGRE another limitation resulted from having the same interviewer administer the ADI-R to the same parent for siblings involved in the study. An

alternative method would have been to have the ADI-R administered by a different rater for each sibling. However it is important to note that in a study conducted by Spiker et al. (1994) differences were not revealed when different raters were used to gather information from the mother of both children with autism.

Difficulty in the sole use of the ADI-R is also a limitation, given that both the independent and dependent variables were drawn only from the ADI-R. This places a large reliance on one assessment tool. The utilization of a primarily multiplex sample also limits the generalizability of the findings to other children in multiplex familial environments. Given that almost all participants were from a multiple-incidence family, and systematic differences may exist between this group and single-incidence families (although this does not appear to be likely), the results of the present study may not be representative (Mahoney et al., 1998). Differences in symptomatology across boys and girls (Cicchetti & Cohen, 1995) and the fact that almost 80% of this sample was males, the findings of this study appears to have limited utility in relation to females. The small sample size and the very young ages involved can be viewed as a limitation of the present study. Information regarding specific comorbid medical conditions and disorders in this sample was lacking resulting in less knowledge pertaining to the homogeneity of the sample. Lastly, it is important to recognize that secure base behaviour is only one variable (of many) which examines the construct of attachment. Overall the present findings can be viewed as preliminary and in need of replication.

Next it is imperative to examine the current findings and their relevance to our understanding of attachment. Implications to current treatment models and future research are also presented in the next section.

Theoretical Implications

In the past research in the area of attachment and autism has examined this population in a similar manner to normative children (or to other clinical populations), utilizing the same measurement tools and conceptualizing this group according to current classifications of attachment quality. And yet with the qualitative differences inherent in Autistic Disorder, it appears that this may not be an accurate method of exploring attachment behaviour in children with autism. In examining previous studies which explored attachment behaviour in this population what appeared evident is that researchers continued to state that present classification systems did not account for the idiosyncratic behaviours associated with Autistic Disorder (Rogers et al., 1991; 1993) and that classification of attachment security which accounts for the behavioural and affective oddities in autism is needed (Sigman & Mundy, 1989). Rogers et al. (1993) also reported that a problem exists in operationalizing the attachment construct (in terms of proximity and contact), as these behaviours do not appear to capture the profound social impairments inherent in Autistic Disorder. Internal working models of the primary caregiver may also differ from typically developing peers given the affective and intersubjective information that is lacking (Rogers et al., 1993).

If we recall a number of factors appear to affect the typical development of the use of a secure base. According to Levy and Orlans (1998) the use of touch, displays of eye contact, the ability to overtly demonstrate attention and positive interaction

through the use of a smile all affect the attachment relationship and a child's consequent attachment behaviour. Need gratification, responsiveness to such needs (Craig & Kermis, 1995), along with the ability to vocalize his or her needs in a verbal fashion and/or nonverbally communicative fashion (Marvin & Britner, 1999) also effect behaviour which impacts environmental exploration. In relation to autism, developmental deviations inherent in Autistic Disorder would seemingly disrupt the course and use of attachment behaviours. Atypicalities in the areas of communication, socialization and interests/behaviours are complexly intertwined and developmentally deviant in children with autism (Fein et al., 1987; Hobson, 1989; Volkmar, 1996, 1987).

The results of the present study revealed that other socialization variables (presented in an atypical fashion the majority of the time) affected secure base behaviour. It seems likely that when critical developmental processes such as these have gone awry, an impact on the quality of the attachment relation would emerge. Further the expression of this relationship through behavioural means would also be compromised, as typical demonstrations of attachment behaviour would seem to be affected by the abnormalities inherent in Autistic Disorder. Abnormalities presented in attachment behaviour emerged in the majority of the sample in this study.

Interestingly separation anxiety, the overt measure of emotional distress was more often typically demonstrated, while secure base behaviour was abnormal. Similarities and differences between groups also emerged in examination of which factors predicted displays of attachment behavior. These findings are peculiar, yet

understandable given deviancies in emotional expression and interrelatedness (Charman et al., 1997; Sigman, 1989).

Wenar (1994) remarked that qualitative differences emerging in the complexly deviant developmental trajectories inherent in Autistic disorder warrant concerns surrounding the use of typical models of development in examination of such atypical processes. Perhaps it is these concerns that need to be addressed in order for mental health professionals to better comprehend the nature of attachment in this inherently odd sample. Given the peculiarities associated with Autistic Disorder and those demonstrated in the present sample, it may be that unlike normative children their appearance of attachment to their primary caregivers differs from what one would expect to see in a typical sample. That is a combination of abnormalities in secure base demonstrations, social smiling, greeting behaviour, shared excitement and pleasure, and showing and directing behaviour with seemingly "typical" expressions of separation anxiety results in a unique presentation of attachment behaviours.

In examination of secure behaviour in this sample, what appears to be significantly affected is a child's ability to spontaneously engage in social relationships. According to Dawson (1990) and Meltzoff and Gopnick (1993) the imitative deficits of children with autism may interfere with the development of other critical social skills such as reciprocity, the understanding of emotional states and joint attention. Their challenges with speech and communication are likely also folded into their socio-emotional difficulties. Additionally attachments to objects rather than people may result in difficulties with intersubjectivity (Auerbach & Blatt, 2001) leaving the conceptualization of attachment behaviour a complex and cumbersome

concept to examine in this population. What appears to be promising is that similar to typical children those diagnosed with Autistic Disorder develop an attachment to their primary caregiver (Dissanayake & Crossley, 1997; Shapiro, Sherman, Calamari, & Koch, 1987; Sigman & Mundy, 1989; Sigman & Ungerer, 1984a).

The present study appears to extend our understanding of how a construct, such as attachment behavior can be examined in a severely affected child population, while challenging us to consider an alternative perspective that perhaps we do not have a clear comprehension of the characteristics of attachment behaviour (and conversely attachment) in this population with autism. Given the current classifications of attachment quality, along with the multiple factors related to such a construct, continual investigation into attachment is needed in order to better comprehend how children with autism develop relationships with their primary caregiver and how such impacts functioning. Just as we see in studies examining attachment in normative, or even other clinical populations, more needs to be done in enabling our understanding of the characteristics of attachment in the context of deviant developmental processes.

In exploration of the attachment literature in relation to current findings, questions continue to be raised regarding the nature of attachment behaviour, namely, do children with autism utilize a secure base in an abnormal fashion? It appears that they could! At the present time however, attachment theory does not account for the unique presentation of secure base behaviour in children with autism but rather attempts to amalgamate autism behaviours and consequent attachment styles into existing categories. As a result attachment theorists likely need to expand their

notions of what attachment behaviour looks like in children with autism in order that the peculiarities and uniqueness inherent in Autistic Disorder be more accurately described in classifications of attachment quality.

Implications for Treatment

Given the present findings, how should current treatment regiments be affected? The next section will discuss early diagnosis and intervention, along with family issues. A brief description of each of these topics is offered to refresh the reader on these critical areas. Afterwards these topics are discussed in relation to the need for an attachment lens to be incorporated into treatment.

If one recalls, a wide variety of treatments presently exist for children with autism, including dietary interventions, megavitamins, educational interventions, sensory integration (Ayres, 1972), auditory integration therapy (Stehli, 1991), pharmacological treatments (Buitelaar & Willemsen-Swinkels, 2000; Diler, Firat, & Avci, 2002), behavior therapy (Lovaas, 1987, 1996; Olley, Robbins, & Morelli-Robbins, 1993), and structured teaching (Lord, 1993). According to Volkmar et al. (1997) the importance of structured interventions is to foster the acquisition of basic communicative, social, and cognitive skills. As a result of the complex challenges associated with autism early identification (Baron-Cohen & Gillberg, 1992) and treatment seems to have remained the focus for children with autism and their family.

Early diagnosis and intervention. It has been reported that early diagnosis is associated with more positive outcomes in individuals with autism (Freeman, 1997; Klinger and Dawson, 1996; Porter et al., 1992). Moreover it is commonly believed that early diagnosis is crucial because it facilitates earlier intervention (Klinger &

Dawson, 1996). Early intervention is based upon the belief that children with developmental disabilities are most responsive to treatment when they are very young (Guralnick, 1991), resulting in changes in social relationships and daily activity patterns, increases in community inclusion, changes in health status or need for crisis intervention, expansion of skill repertoires, and a reduction in problem behavior (Dawson & Osterling, 1996)

Family issues. Family issues likely impact treatment outcome in children with autism, as Harris (1994) reported that the manner in which a family responds to a child with autism has the potential to influence both the child's manifestation of behavior problems and the child's educational gains. According to Paul (1987) the presence and involvement of family members would appear to be logically related to outcome. Having a dysfunctional, disorganized family, and/or clinically depressed parent may also create stress for the individual with autism, resulting in chaos in the home environment (Harris, 1994). In addition, parent-child interactions are affected in families with a developmentally challenged child (Rodrigue, Geffken, & Morgan, 1994).

Attachment and treatment. Early intervention in the treatment of autism appears to be useful and, from an attachment perspective, exploring the utility of directly and intentionally incorporating parent-child interventions into treatment seems to be the next step. Attachment theorists emphasize the crucial nature of attachment in relation to later socialization, yet, when we examine present treatment modalities designed to "better" such social oddities, the use of attachment theory does not appear to be an integral part of the process.

A child's social communication abilities seem to be paramount in affecting the use of a secure base. At the present time early intervention programs focus on both the development of communication and social skills, and attempt to reduce problematic behaviours. It seems that an increased focus on the development of the parent-child relationship and specific factors which enhance, or hinder its development would be important. Given the qualitatively distinct behaviours present in the child, and the fact that such oddities will be brought forth into the primary caregiver relationship, the structured facilitation of a relationally-based platform for treatment would augment the present emphases of social communication and emotional development by including the parent as a direct part of the treatment.

At the present time a caregiver is typically educated in the development and implementation of a child's treatment, in order that specific tools and strategies can be used and generalized to home and family environments. In this role the caregiver also takes on the position of behaviour therapist, implementing techniques to facilitate appropriate behaviour, social awareness and interaction, and to decrease problematic behaviours, such as behavioural/verbal perseverations and self-injurious behaviour. In addition to doing such, caregivers should also be included in a specific curriculum program that would be attachment focused. Yet how does one accomplish this?

Components of filial therapy, a structured treatment program for children with behavioural and emotional problems could be drawn from in efforts to strengthen the attachment relationship (Landreth, 1991). Such treatment could look to build on the existing strengths present in this relationship, while exploring the tenets of their interactions which may have been strained as result of the child's disorder (Harris,

1994). In filial therapy sensitive interactions are promoted, while more responsive and accepting forms of communication are taught (Deprey, 2001). According to Bratton and Landreth (1995), such redirection can promote the development of alternative perspective taking and the building of healthy relationships. Thus treatment models could utilize some the principles inherent in attachment-based therapies to enhance quality of the parent-child dyad, while continuing to address the qualitative oddities and problem behaviours associated with Autistic Disorder.

Implications for Future Research

The information gathered in this study provides direction for future attachment research in autism. Although exploratory in nature, the present study suggests possible avenues for future research. Additional information regarding the factors which are related to attachment could lead to a better understanding of a child's socio-emotional development. A clearer understanding of the attachment patterns of children with autism could provide a framework for researchers to better comprehend the enigma of the social abnormalities inherent in Autistic disorder. Future researchers may need to explore alternative methods of measuring attachment in children with autism (i.e. other than the Strange Situation Paradigm) in order to better assess the attachment behaviors of children with autism. Developing tools specific to measuring attachment behavior in autism may then incorporate all behaviours into their attachment paradigm, rather than ignoring certain behaviours (Capps et al., 1994). Such a tool would aid in a better conceptualization of attachment quality in this population. With further investigation of attachment quality there may be a need to re-examine current classification systems of attachment quality and expand categories,

exploring the possibility of adding a Type E "Qualitatively Distinct" attachment style to include the unique presentation of children with autism and possibly other Pervasive Developmental Disorders. Lastly it is necessary to examine factors related to attachment behavior and their impact over time. Such longitudinal research may allow for more specific conclusions to be made regarding the relational factors associated with positive outcome in autism.

Conclusion

The present study explored secure base behaviour in children with autism. One hundred and eight children between the ages two and four took part in this study. All participants had been formally diagnosed with Autistic Disorder. The primary research question predicted differences between a younger and older group of children with autism in relation to attachment behaviour. As well three secondary research questions were examined and variables within the domains of communication, socialization, and interest/behaviours were assessed in relation to a child's use of a secure base. Results indicated that significant differences did not emerge between the younger and older group; however most variables which affected secure base behaviour differed across groups. That is the specific variables assessing social smiling and shared excitement in another's pleasure significantly impacted secure base behaviour in the younger group, while showing and directing attention and separation anxiety were significantly related to attachment behaviour in the older group. Similar in both groups, the variable assessing greeting behaviour significantly accounted for change in secure base behaviour.

Final Remarks

Examining variables associated with parent-child relationships in young children diagnosed with Autistic Disorder expands the understanding of elements which impact the demonstration of attachment behaviour. Given that a great deal of diversity exists within this clinical population, it is difficult to definitively comprehend the nature of such relationships. Qualitative oddities inherent in the presentation of autism need to be further examined in relation to their impact on parent-child relationships.

It is evident that attachment research has the potential to provide a clearer understanding of the perplexities of autism. Moreover it may likely impact the development of more effective treatment methods. It appears that a better comprehension of relational factors would augment the constitution of current treatment programs. Such an addition to intervention programs may likely improve overall family functioning (Harris, 1982). For these reasons, it is imperative that research examining attachment in autism be continued.

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Appendix A

*DSM-IV Criteria for Autistic Disorder**

A. Total of at least six times from (1), (2), and (3), with at least two from (1), and one of each from (2) and (3):

(1) Qualitative impairment in social interaction, as manifested by at least two of the following:

(a) marked impairment in the use of multiple, nonverbal behaviors such as eye-eye gaze, facial expression, body postures, and gestures to regulate social interaction

(b) failure to develop peer relationships appropriate to developmental level

(c) a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest to other people)

(d) lack of social or emotional reciprocity

(2) Qualitative impairments in communication as manifested by at least one of the following:

(a) delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gestures or mime)

(b) in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others

(c) stereotyped and repetitive use of language or idiosyncratic language

(d) lack of varied spontaneous make-believe play or social imitative play appropriate to developmental level

(3) Restricted repetitive and stereotyped patterns of behavior, interests, and activities, as manifested by at least one of the following:

(a) encompassing preoccupation with one or more stereotyped and restricted patterns of interest that are abnormal either in intensity or focus.

(b) apparently compulsive adherence to specific, nonfunctional routines or rituals

(c) stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole body movements)

(d) persistent preoccupation with parts of objects

B. Delays or abnormal functioning in at least one of the following areas, with onset prior to age three: (1) social interaction, (2) language as used in social communication, or (3) symbolic or imaginative play.

C. Not better accounted for by Rett's disorder or childhood disintegrative disorder.

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Appendix B

Patterns of Children's Interactive Behavior with the Caregiver in the Strange Situations Associated with the Four Major Attachment Patterns

Patterns of attachment	Description of Interactive Behavior
Type A: Insecure-avoidant	Independent exploration Active avoidance upon reunion (e.g., turning, looking, or moving away, ignoring; no avoidance of stranger)
Type B: Secure	Caregiver is a secure base for exploration Active in seeking contact or interaction upon reunion
Type C: Insecure-ambivalent	Poverty of exploration (e.g., difficulty separating to explore; may need contact even prior to separation; wary of novel situations and people). Difficulty settling upon reunion (e.g., may mix contact seeking with contact resistance such as hitting and kicking;
Type D: Disorganized-disoriented	Sequential and/or simultaneous displays of contradictory behavior patterns; undirected and incomplete movements and expressions; stereotypies; asymmetrical movements; anomalous postures; freezing, stilling and dazing; apprehension toward caregiver

Note: Adapted from Ainsworth and al. (1978) and Main and Solomon (1990), cited in Cicchetti (1995).

Appendix C

CONSENT TO PARTICIPATE IN RESEARCH

AUTISM GENETIC RESOURCE EXCHANGE (AGRE)
Funded by Cure Autism Now (CAN) Foundation and
In Association With the National Institute of Mental Health (NIMH)
Human Genetics Initiative

- PURPOSE

You and your family have been invited to participate in the Autism Genetic Resource Exchange (AGRE), funded in part by Cure Autism Now (CAN) foundation, and in association with the National Institute of Mental Health (NIMH) Human Genetics Initiative.

AGRE and NIMH ("AGRE/NIMH") would like to help scientists learn more about how genes effect the development of autism. In order to make this research possible, we are gathering (a) family and medical information and (b) cell lines, DNA, and serum (hereafter referred to, collectively, as "biomaterials") from persons who appear to be affected with autism spectrum disorders and their families. Our goal is to create a genetic resource (gene bank) to accelerate the discovery of genes underlying autism and related disorders. AGRE/NIMH will store the biomaterials at a cell repository in Piscataway, New Jersey. AGRE/NIMH will make the biomaterials, medical information, and other data collected in this study available to scientists who want to do research on autism and related disorders. Any use of these materials would first need to be reviewed and approved by AGRE and/or NIMH.

Because one or more people in your family appear to be affected with autism or a related disorder, we are contacting you to see if you would be willing to contribute family and medical information and a blood specimen to AGRE/NIMH for use in future research on autism spectrum disorders. (In this consent form, "you" refers to you, your children, and/or your immediate family.)

- **PROCEDURES**

If you agree to participate, we will draw a small sample of blood from you (a maximum of 24 ml., or 4 to 5 teaspoons). The blood sample you give will be used to create an immortalized cell line, from which DNA can be continually produced. The blood sample will be sent to the repository in New Jersey. There, DNA will be taken from the cell line and used for scientific research now and in the future. In addition, karyotyping (chromosomal analysis) and fragile X testing will be performed on at least one family member's samples. You will be asked at the end of this form to indicate whether you wish to receive any positive results from these karyotyping and

fragile X tests, which would be communicated through your family physician or genetic counsellor.

This research involves gathering information about you and your family from a variety of sources, including family and medical history questionnaires, the Autism Diagnostic Interview-Revised (ADI-R), the Autism Diagnostic Observation Schedule (ADOS), the Peabody Picture Vocabulary Test (PPVT), the Raven's Coloured Progressive Matrices (Raven's), the Vineland Adaptive Behaviour Scales (Vineland), physical and neurological examinations, medical records, videotapes, still photography, and extended family questionnaires. (All of the information collected from these various sources will be referred to, collectively, as your "family data.") Most of these procedures pertain only to child(ren) affected with autism or related disorders, although some will also involve parents and unaffected siblings. At the end of this form you will be asked to indicate whether you will allow your child(ren) to be videotaped and/or photographed.

These procedures will be performed in your home and by telephone by trained members of the AGRE research team. In some cases, however, you may have your blood drawn in your family physician's office or other medical facility. These sessions will take place on different dates, sometimes with many months in between sessions, by the following members of the research team: (a) A certified phlebotomist will draw your blood; (b) a practicing physician specializing in pediatric neurology will perform the medical and family history interviews, the physical and neurological examinations, PPVT's, Raven's, and ADOS's; and (c) trained interviewers will conduct ADI-R's, ADOS's, PPVT, Raven's, and Vineland's. In addition, you may be contacted in the future by AGRE in order to clarify previous family data or to obtain additional information about you and your family.

DNA and medical information collected from you will be stored at the repository and the family data collected from you will be stored at the AGRE resource. Your biomaterials and family data will be coded to keep your identity confidential and will be stored as a resource for researchers. In addition, your family pedigree (showing the number of children with autism spectrum disorders) will be coded for confidentiality and published in a hardcopy and on-line catalog for researchers. AGRE/NIMH will provide all of this coded family and genetic data to qualified researchers around the world to study how genes contribute to autism and related disorders. Some of this data will also be put on line in a password-protected website for qualified researchers approved by AGRE.

- **RISKS**

There are no more than minimal medical or psychological risks associated with this research. You may feel some pain associated with having blood drawn. You may experience discomfort, bruising, and/or other bleeding at the site where the needle is

inserted. Sometimes people get dizzy or feel faint when their blood is drawn. Infection is a risk but is very rare.

An insurance company might consider participation in a family study an indication of higher risk because it implies that there is a family history of a genetic condition. This might then hurt your access to health or other insurance. If you tell your family doctor that you have participated in this study, or if you tell your doctor about any specific aspects relating to your participation, this information may then become part of your medical record with this doctor. Insurance companies routinely have access to such records. We will not release information about you or your family to your doctor unless you authorize us to do so.

- **BENEFITS**

Although you personally will not receive any direct benefit from this project, individuals who might develop autism in the future, their family members, and future generations may benefit if researchers using these family samples can locate genes that lead to such disorders. We do not expect to discover any information of direct clinical relevance to your condition or your treatment during the next few years. Because the meaning of research results are not usually fully understood, these results generally are not made available to subjects or their doctors. If later on, diagnostic tests or new ways to treat your condition are discovered, this information should be obtained from properly licensed clinical labs or clinics, and will not come from the research team.

- **COSTS AND COMPENSATION**

There are no costs to subjects in this research project. If requested, you will receive reimbursement for childcare costs (up to $75 per visit) incurred as a result of your participation. If you are injured as a result of this research, there is no compensation for such injury.

Many research groups include scientists from private companies. Scientists who receive your biomaterials and medical information may work with a private company. Such companies have a financial interest in using information found from studying biomaterials. This includes developing commercial products that may later help others by improving the diagnosis and treatment of various medical problems. If a commercial product is developed from this research, it will be owned by the researcher, the private company, and/or AGRE. These companies may also patent products or sell discoveries based on this research. Some of the scientists who study your biomaterials and family data may get some financial benefit from this work. There are no plans to provide any compensation to you or your heirs should this occur.

- **CONFIDENTIALITY**

Within the limits imposed by technology and the law, every effort will be made to maintain the privacy of your genetic information. We will keep confidential your name and any other personal information we learn about you. We will not give out this information to the repository or to anyone else outside of the AGRE research team. If any publication or presentations result from this research, you will not be identified by name.

We will take the following steps to ensure confidentiality: A research number will be assigned to you, and your name will not be used. The results from the analysis of your biomaterials will not be released or shared in any way with your relatives, with insurance companies, or with any third party not involved in research, unless you consent in writing to the release of that information. Any samples or data leaving AGRE/NIMH will be coded for confidentiality and shared only with those qualified investigators who have signed the appropriate distribution agreement with AGRE/NIMH. All family data and genetic information that go on-line will be coded for confidentiality and strictly secured against unauthorized release. AGRE cannot guarantee, however, that such release will never occur.

Every attempt will be made by the investigators to maintain all information collected in this study strictly confidential, except as may be required by court order or by law. For example, if anyone on the research team learns that you or someone else is in serious danger of harm, the research team may need to make disclosures to protect you and/or the other person(s). In addition, authorized representatives of the University of Pennsylvania Institutional Review Board (IRB), a committee charged with protecting the rights and welfare of research subjects, may be provided access to medical or research records that identify you by name.

- **PARTICIPATION IS VOLUNTARY**

Your participation in this research is VOLUNTARY. You will not lose any benefits or access to treatment that you otherwise are entitled to if you do not want to be in this study.

- **WITHDRAWAL FROM THE RESEARCH PROJECT**

You have the right to leave the study at any time without giving any reason, and without prejudice to you or your family. If you wish to leave the study, please contact an AGRE representative at one of the numbers listed below. We will then remove your family data and tell the repository to remove your biomaterials. We will keep your identity a secret by using a code number. The repository can use this code number to remove your biomaterials, without ever knowing your name or other

personal information. By using this code number, the repository will tell researchers to not include your data in their research. These researchers will not know your name or other personal information we learn about you. While *not all* of your biomaterials can be withdrawn from researchers, AGRE/NIMH will discontinue distribution of these samples and will make reasonable effort to notify researchers to discontinue research on these biomaterials.

- **SUBJECT RIGHTS**

If you wish further information regarding your rights as a research subject, you may contact Janice Sowinski at AGRE/HBDI by telephoning (800) 345-4234 Ext. 232. If you have been enrolled in this program through the University of Pennsylvania, you may call the Director of Regulatory Affairs at (215) 898-2614.

- **CONTACTS**

If you have any further questions about this study or your participation, or if there are any problems or injuries associated with this study, you may contact Janice Sowinski, at AGRE/HBDI, 1880 John F Kennedy Blvd., 6th Floor, Philadelphia, PA 19103, Telephone: (800) 345-4234 Ext. 232, E-mail: ž HYPERLINK "mailto:jsowinsk@mindspring.com" – jsowinsk@mindspring.com or an AGRE representative at 5455 Wilshire Blvd., Suite 715, Los Angeles, CA, Telephone: (866) 612-2473, E-mail: ž HYPERLINK "mailto:assessment@agre.org" – assessment@agre.org .

You will get a copy of this consent form to keep.

If you sign below, it means that you have read (or have had read to you) the information given in this consent form, and have had the opportunity to discuss this study and these procedures with the AGRE representative. Your signature below means that you are agreeing to be a volunteer in this study and are agreeing to have your minor children (listed below) participate in this study. If you are a minor (or incapacitated), we must have your parent or legal guardian sign on your behalf.

- **SIGNATURE OF RESEARCH SUBJECTS**

BY SIGNING THIS FORM, I WILLINGLY AGREE TO PARTICIPATE AND TO ALLOW MY CHILDREN TO PARTICIPATE IN THE RESEARCH IT DESCRIBES. (If both parents are participating as subjects in this study – i.e., by giving blood or family data – both parents must sign this form.)

_____

Printed Name of Parent/Subject or Legal Guardian

Signature of Parent/Subject or Legal Guardian **Date**

Printed Name of Parent/Subject or Legal Guardian

Signature of Parent/Subject or Legal Guardian **Date**

Printed Name of Adult Subject or Legally Effective Representative

Signature of Adult Subject or Legally Effective Representative **Date**

Printed Name(s) of Participating Minor Children:

Please check and initial the appropriate boxes below:

☐ _____I give permission to have my child(ren) videotaped.
☐ _____I *do not* give permission to have my child(ren) videotaped.

☐ _____I give permission to have my child(ren) photographed.
☐ _____I *do not* give permission to have my child(ren) photographed.

I AGREE TO HAVE *AGRE* CONTACT ME IN THE FUTURE TO REQUEST MY PARTICIPATION IN OTHER ASPECTS OF THIS PROJECT OR IN OTHER AGRE RESEARCHER-ASSOCIATED STUDIES (Circle One): **YES NO**

Initial here _____ if you wish to receive fragile x and karyotyping results (if performed), should either test result in a positive finding. If you choose to receive this information it will be forwarded to your family physician or genetic counsellor. By initialling here, you are authorizing us to contact your physician or genetic counsellor listed below. It is your responsibility to let AGRE know if your address and/or telephone number, or those of your physician or genetic counsellor, change.

Your Family Physician or Genetic Counsellor:

Name:_____

Address:_____

City, State, Zip:_____

Telephone:_____

- **SIGNATURE OF AGRE REPRESENTATIVE**

I have explained the research to the parent/subject or subject's legal guardian, and answered all of his or her questions. I believe that he or she understands the information described in this document and freely consents to participate.

_____

Printed Name of AGRE Representative

_____

Signature of AGRE Representative

_____

Date (must be the same as Parent/Subject's)